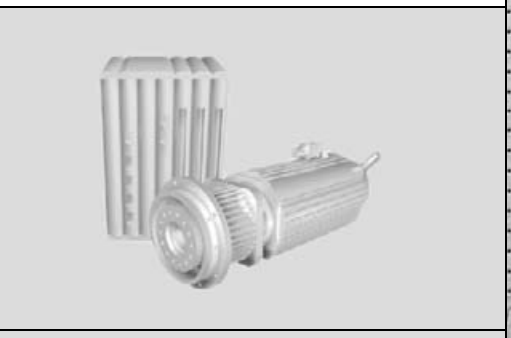
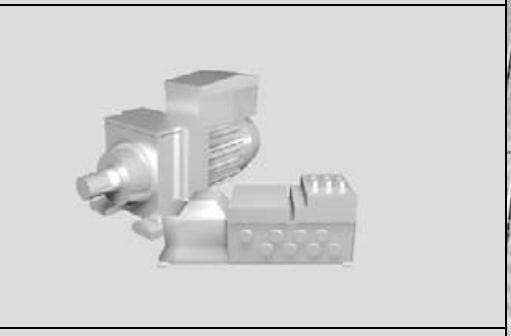
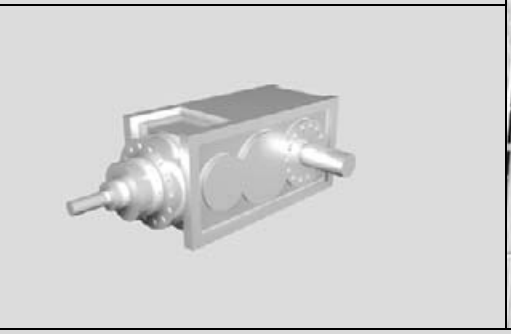
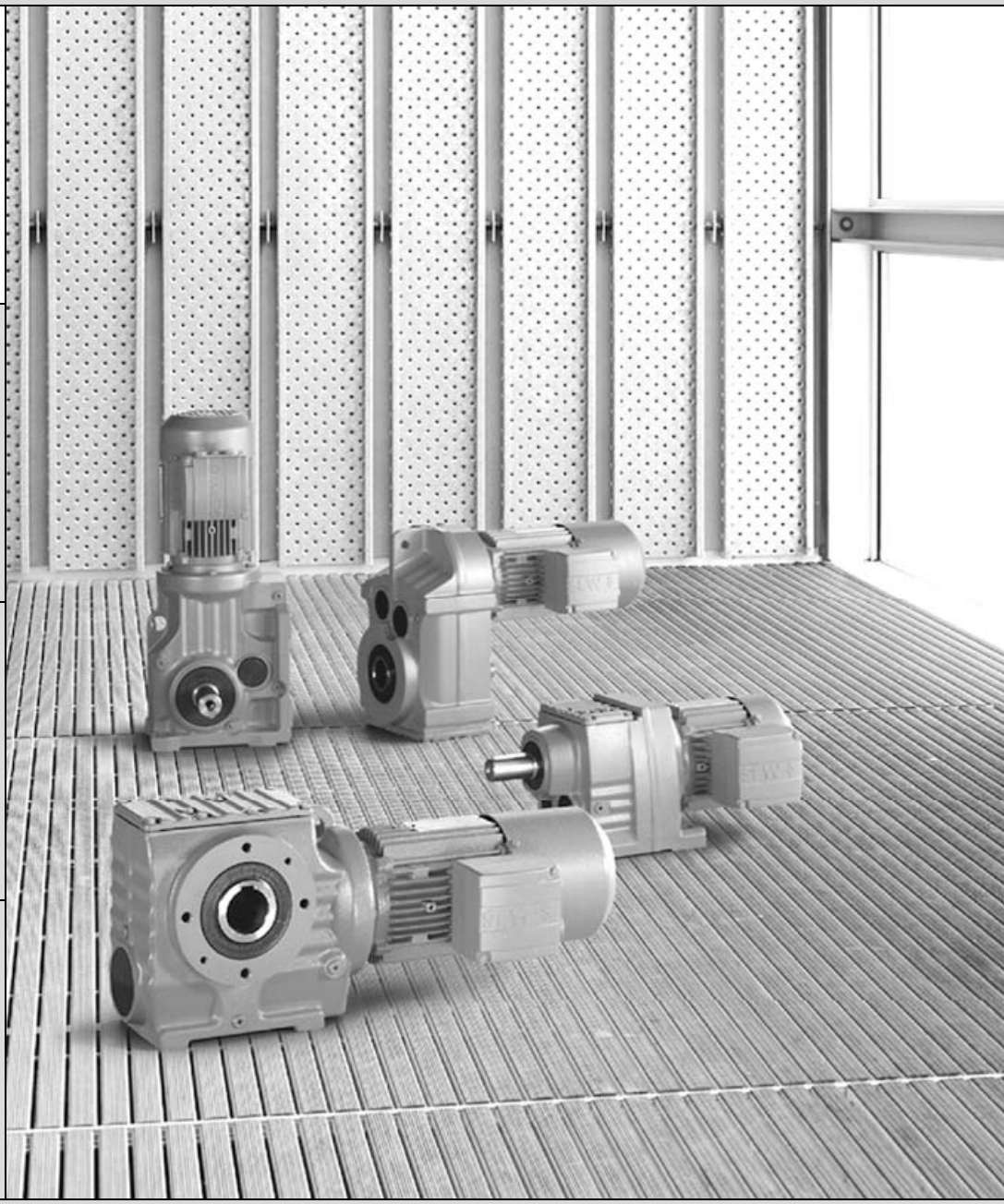
SEW EURODRIVE









Explosion-Proof Gear Units R..7, F..7, K..7, S..7, Spiroplan® W Series

A6.E02

Edition 05/2004

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Operating Instructions

SEW
EURODRIVE

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1 Important Notes

Safety and warning instructions

Always follow the safety and warning instructions in this publication!

Electrical hazard
Possible consequences: Severe or fatal injuries.

Hazard
Possible consequences: Severe or fatal injuries.

Hazardous situation
Possible consequences: Slight or minor injuries.

Harmful situation
Possible consequences: Damage to the drive and the environment.

Tips and useful information.

Important information about explosion protection.

You must adhere to the operating instructions to ensure:

- Trouble-free operation
- Fulfillment of any rights to claim under guarantee

Consequently, read the operating instructions before you start working with the gear unit!

The operating instructions contain important information about servicing. Therefore, keep the operating instructions close to the gear unit.

- Adjust the lubricant fill volume and the position of the breather valve accordingly in the event of a change of mounting position (see Sec. "Lubricants" and Sec. "Mounting positions").
- Please follow the instructions in Sec. "Mechanical installation" / "Installing the gear unit"!

Disposal

Please follow the latest instructions: Dispose in accordance with the material structure and the regulations in force, for instance as:

- Steel scrap:
  - Housing components
  - Gears
  - Shafts
  - Anti-friction bearings
  - Gray cast iron (unless separate collection takes place)
- Some worm gears are made from non-ferrous metal. Dispose of worm gears accordingly.
- Collect waste oil and dispose of it correctly.

2 Safety Notes

Preface

The following safety notes are principally concerned with the use of gear units. If using **gearmotors**, please also refer to the safety notes for motors in the corresponding operating instructions.

Please also take account of the supplementary safety notes in the individual sections of these operating instructions.

General information

During or after operation, gearmotors, gear units and motors have:

- Live parts
- Moving parts
- Possibly hot surfaces

Only qualified specialists are allowed to undertake the following work:

- Transportation
- Putting into storage
- Installation / mounting
- Connection
- Startup
- Maintenance
- Maintenance

Please comply with the following instructions and documents when doing so:

- Associated operating instructions and wiring diagrams
- Warning and safety signs on the gear unit / gearmotor
- Regulations and requirements for the specific system
- National / regional regulations governing safety and the prevention of accidents

Serious injuries and property damage may result from:

- Improper use
- Incorrect installation or operation
- Unauthorized removal of necessary protection covers or the housing

Designated use

Gearmotors / gear units from SEW-EURODRIVE are intended for industrial systems. They correspond to the applicable standards and regulations.

The technical data and the information about permitted conditions are to be found on the nameplate and in the documentation.

It is essential to comply with all the entries!

Transportation

Inspect the shipment for any damage in transit as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to refrain from starting up the drive.

Tighten installed transportation lugs. They are only designed for the weight of the gearmotor / gear unit. Do not attach any additional loads.

The installed lifting eyebolts are in accordance with DIN 580. Always observe the loads and regulations specified in the DIN standard. If the gearmotor has two suspension eye lugs or lifting eyebolts, then you should also use both suspension eye lugs for attaching transport ropes. In this case, the tension force vector of the slings must not exceed a 45° angle in accordance with DIN 580.

Use suitable, sufficiently rated handling equipment if necessary. Remove any transportation fixtures prior to startup.

Extended storage of gear units

Gear units of the "extended storage" type have:

- An oil fill suitable for the mounting position so the unit is ready to run (mineral oil CLP and synthetic oil CLP HC). You should still check the oil level before startup (see Sec. "Inspection/maintenance" / "Inspection/maintenance work").
- A higher oil level in some cases (synthetic oil CLP PG / food grade oil). Correct the oil level before startup (see Sec. "Inspection/maintenance" / "Inspection/maintenance work").

Comply with the storage conditions specified in the following table for extended storage:

Climate zone	Packaging[1)]	Storage location	Storage time
Temperate (Europe, USA, Canada, China and Russia, excluding tropical zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap.	With roof, protected against rain and snow, no shock loads.	Up to three years with regular checks on the packaging and moisture indicator (relative atmospheric humidity less than 50 %).
	Open	With roof, enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 60 °C, < 50 % relative atmospheric humidity). No sudden temperature fluctuations and controlled ventilation with filter (free from dirt and dust). No aggressive vapors and no shock loads.	Two years or more given regular inspections. Check for cleanliness and mechanical damage as part of the inspection. Check corrosion protection.
Tropical (Asia, Africa, Central and South America, Australia, New Zealand excluding temperate zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap. Protected against insect damage and mildew by chemical treatment.	With roof, protected against rain, no shock loads.	Up to three years with regular checks on the packaging and moisture indicator (relative atmospheric humidity less than 50 %).
	Open	With roof, enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 60 °C, < 50 % relative atmospheric humidity). No sudden temperature fluctuations and controlled ventilation with filter (free from dirt and dust). No aggressive vapors and no shock loads. Protection against insect damage.	Two years or more given regular inspections. Check for cleanliness and mechanical damage as part of the inspection. Check corrosion protection.

1) Packaging must be performed by an experienced company using the packaging materials that have been expressly specified for the particular application.

Installation / mounting	Follow the instructions in Sec. "Installation" and Sec. "Assembly/disassembly"!
Startup / operation	Check the direction of rotation is correct in **decoupled** status. Also listen for unusual grinding noises as the shaft rotates. Secure the shaft keys for test mode without drive components. Do not render monitoring and protection equipment inoperative even for test mode. Switch off the gearmotor if in doubt whenever changes occur in relation to normal operation (e.g. increased temperature, noise, vibration). Determine the cause; contact SEW-EURODRIVE if necessary.
Inspection / maintenance	Follow the instructions in Sec. "Inspection/maintenance"!

2.1 Safety notes for use in potentially explosive atmospheres

Explosive gas mixtures or concentrations of dust can lead to severe or fatal injuries in conjunction with hot, live and moving parts of the gear unit / gearmotor.

Installation, connection, startup, maintenance and repair work on gear units/gearmotors and the optional electrical components may only be performed by qualified personnel while taking the following into account:

- these instructions,
- the warning and information signs on the gear unit / gearmotor,
- all other project planning documents, operating instructions and wiring diagrams appertaining to the drive,
- the specific regulations and requirements for the system and
- currently valid national / regional regulations (explosion protection, safety, prevention of accidents).

Designated use

The gear units / gearmotors are intended for industrial systems and may only be used in accordance with the information provided in SEW-EURODRIVE's technical documentation and the information given on the nameplate. They comply with the applicable standards and regulations and meet the requirements of the Directive 94/9EC.

A drive motor connected to the gear unit is only allowed to be operated under the conditions described in Sec. "Starting up gear units / gearmotors in potentially explosive atmospheres".

A motor connected to the gear unit is only allowed to be operated on the frequency inverter providing the entries on the nameplate of the gear unit are complied with!

If a gear unit is used in combination with a variable speed gear unit, particular attention must be paid to complying with the operating instructions supplied with the variable speed gear unit.

A motor mounted on the gear unit using an adapter or belt (for example) is only allowed to be operated providing the entries on the nameplate of the gear unit are complied with!

The immediate vicinity must be free from aggressive media that might attack the paint and seals.

2.2 Checklists

Before startup This checklist lists all activities that have to be carried out **before startup** of a gear unit in accordance with Directive 94/9/EC in a potentially explosive atmosphere.

Check in the PEA before startup	Check	Information in Sec. ...
Inspect the shipment for any damage in transit as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to preclude startup. Remove any transport fixtures prior to startup.		2
Do the entries on the nameplate of the drive match the permitted potentially explosive atmosphere operating range on-site: • Equipment group • Ex category • Ex zone • Temperature class • Maximum surface temperature		3.6 and 4.6
Have measures been taken to ensure that no potentially explosive atmosphere, oils, acids, gases, vapors or radiated interference are present when the gear unit is being installed?		4.2
Is the ambient temperature (acc. to table of lubricants) complied with?		9
Have measures been taken to ensure that the gear units are sufficiently ventilated and that they are not subject to heating from an external source (e.g. via couplings)? The cooling air must not exceed a temperature of 40 °C.		4.3 and 4.6
Does the mounting position match the mounting position stated on the nameplate of the gear unit? Please note: You must contact SEW-EURODRIVE first before changing the mounting position. Failure to contact us will invalidate the ATEX certification!		4.3
Does the oil level for the mounting position match the oil fill volume stated on the nameplate of the gear unit?		4.3
Is there unobstructed access to all oil checking and drain screws as well as to breather plugs and valves?		4.3
Do all input and output elements to be installed have ATEX certification?		4.4
In the case of single gear units with adapters or an input shaft assembly, have measures been taken to ensure that the entries stated on the nameplate of the gear unit are not exceeded?		5.6
When installing gear units with a hollow shaft and shrink disk: • Is the hood cover installed correctly?		4.9
When installing the coupling of adapter AM, AQA: • Do not use any spacing bushings to facilitate assembly!		4.11 and 4.12
When installing a motor on the input shaft assembly AD: • Does the belt between the input shaft end and the motor shaft have a sufficient shunt resistance ($< 10^9\ \Omega$)? • Before installing a safety hood: Has the manufacturer of the safety hood conducted a risk analysis to demonstrate that no sources of ignition (e.g. impact sparks from grinding) can occur?		4.14
For mains-operated motors: • Check the entries on the nameplates of the gear unit and the motor correspond to the actual conditions on-site.		5.6
For inverter-operated gearmotors: Check that the gearmotor is approved for operation with an inverter • The parameter settings of the inverter must prevent an overload of the gear unit (→ gear unit nameplate)		5.6

During startup This checklist lists all activities that have to be carried out **during startup** of a gear unit in accordance with Directive 94/9/EC in a potentially explosive atmosphere.

Check in the PEA during startup	Check	Information in Sec. ...
Measure the surface temperature after approx. 3 hours. The temperature must not differ from the ambient temperature by more than 70 K. Stop the drive immediately and contact SEW-EURODRIVE if the value is > 70 K!		5.4
Measure the oil temperature. Add 10 K to the measured value. Use this value to ascertain the lubricant change interval.		5.4
Note the following point for gear units with AM adapter or input shaft assembly AD with backstop RS: • The minimum speed during rated operation must not be lower than the lift-off speeds of the backstops.		4.11 and 4.13

3 Gear Unit Structure

The following illustrations are block diagrams. Their purpose is only to make it easier to assign components to the spare parts lists. Discrepancies are possible depending on the gear unit size and version!

3.1 Basic structure of helical gear units

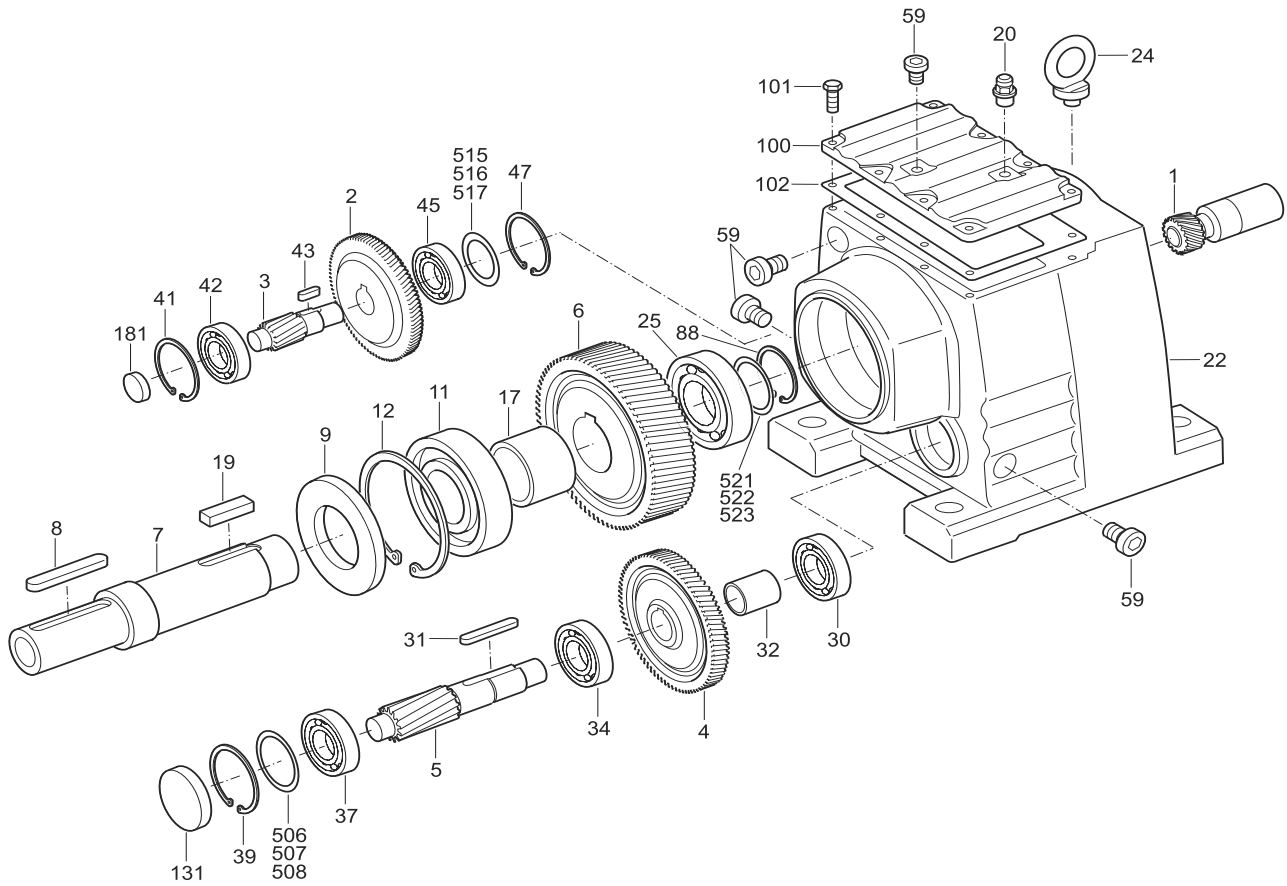

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Figure 1: Basic structure of helical gear units

Legend

1	Pinion	19	Key	42	Anti-friction bearing	507	Shim
2	Gear	20	Breather valve	43	Key	508	Shim
3	Pinion shaft	22	Gearcase	45	Anti-friction bearing	515	Shim
4	Gear	24	Lifting eyebolt	47	Circlip	516	Shim
5	Pinion shaft	25	Anti-friction bearing	59	Screw plug	517	Shim
6	Gear	30	Anti-friction bearing	88	Circlip	521	Shim
7	Output shaft	31	Key	100	Gearcase cover	522	Shim
8	Key	32	Spacer	101	Hex head screw	523	Shim
9	Oil seal	34	Anti-friction bearing	102	Seal		
11	Anti-friction bearing	37	Anti-friction bearing	131	Closing cap		
12	Circlip	39	Circlip	181	Closing cap		
17	Spacer	41	Circlip	506	Shim		

3.2 Basic structure of parallel shaft helical gear units

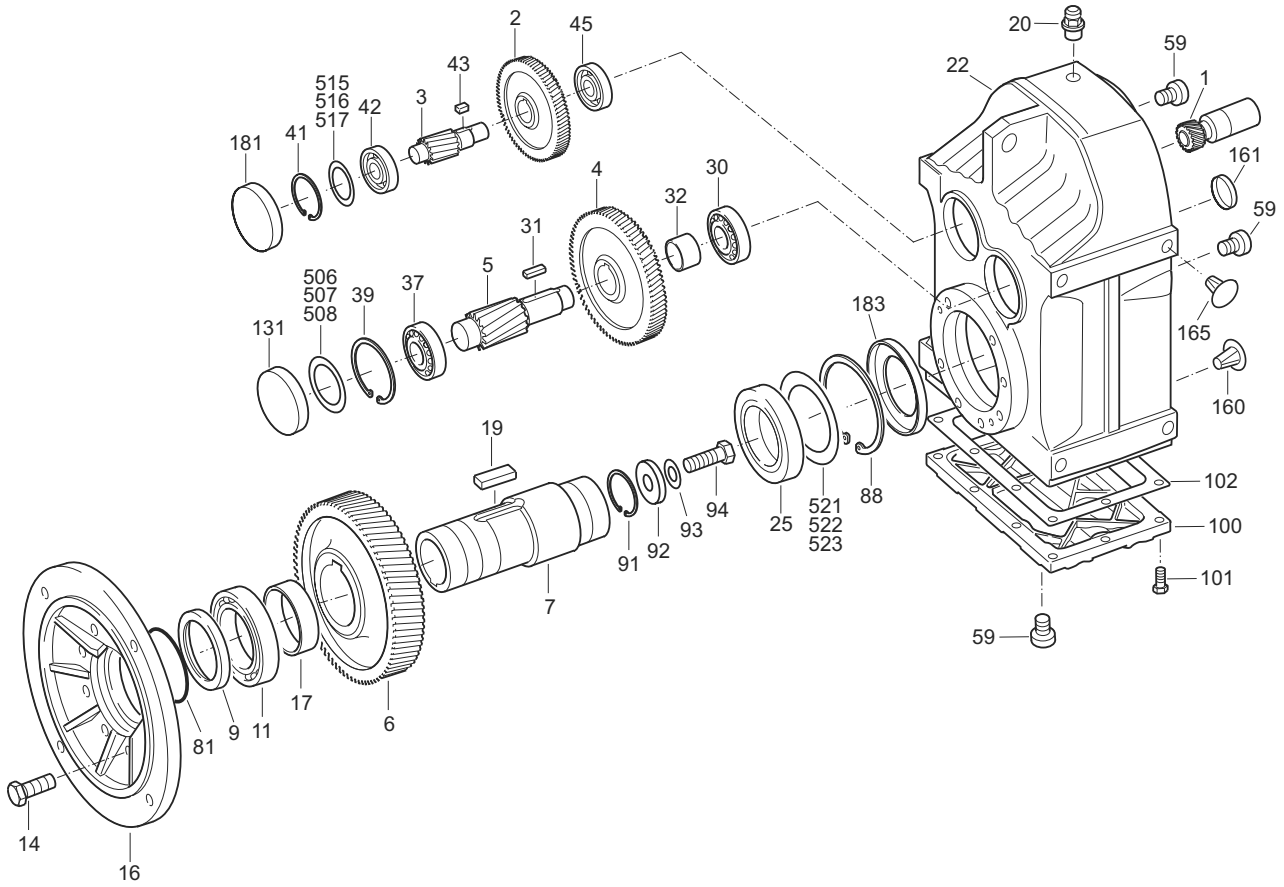

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Figure 2: Basic structure of parallel shaft helical gear units

Legend

1	Pinion	22	Gearcase	91	Circlip	506	Shim
2	Gear	25	Anti-friction bearing	92	Washer	507	Shim
3	Pinion shaft	30	Anti-friction bearing	93	Lock washer	508	Shim
4	Gear	31	Key	94	Hex head screw	515	Shim
5	Pinion shaft	32	Spacer	100	Gearcase cover	516	Shim
6	Gear	37	Anti-friction bearing	101	Hex head screw	517	Shim
7	Hollow shaft	39	Circlip	102	Seal	521	Shim
9	Oil seal	41	Circlip	131	Closing cap	522	Shim
11	Anti-friction bearing	42	Anti-friction bearing	160	Closing plug	523	Shim
14	Hex head screw	43	Key	161	Closing cap		
16	Output flange	45	Anti-friction bearing	165	Closing plug		
17	Spacer	59	Screw plug	181	Closing cap		
19	Key	81	O-ring	183	Oil seal		
20	Breather valve	88	Circlip				

3.3 Basic structure of helical-bevel gear units

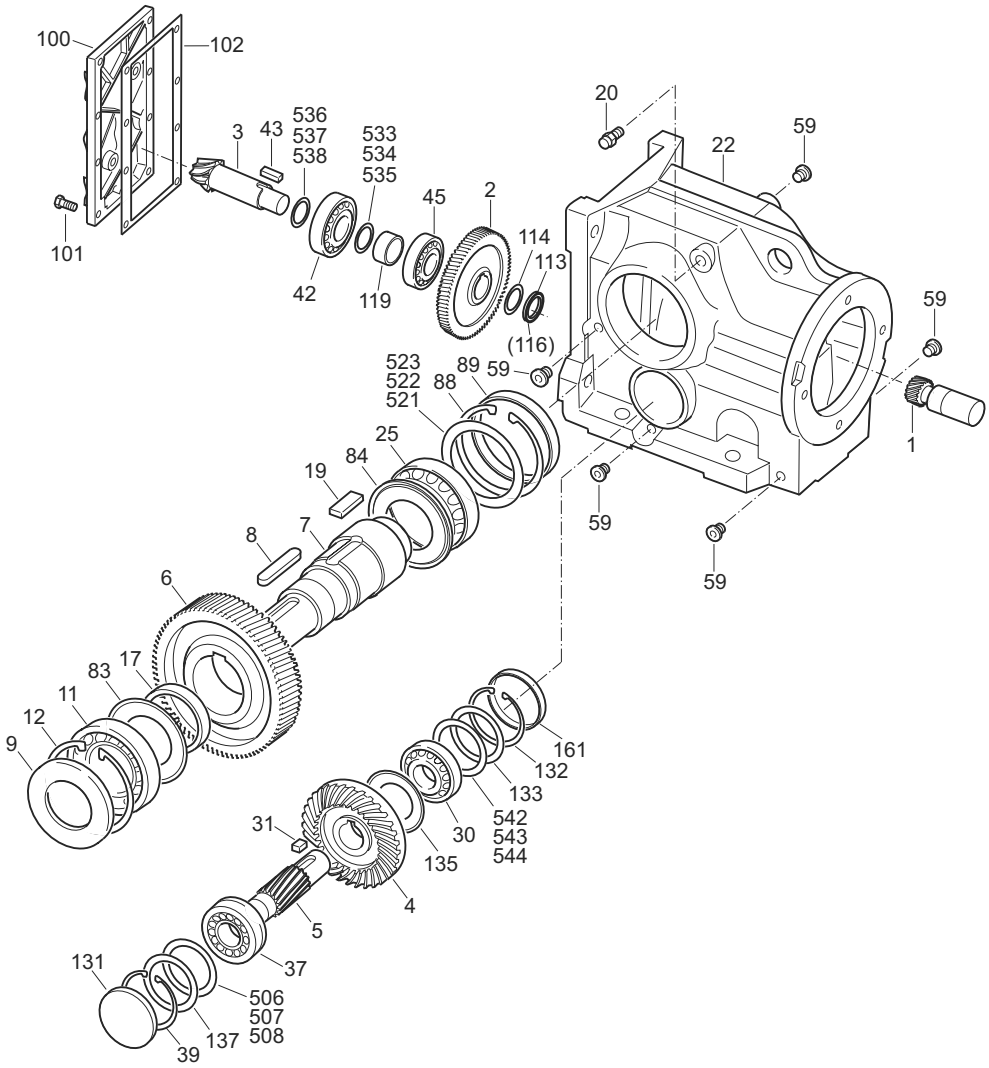

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Figure 3: Basic structure of helical-bevel gear units

Legend

1 Pinion	25 Anti-friction bearing	102 Adhesive and sealing compound	522 Shim
2 Gear	30 Anti-friction bearing	113 Slotted round nut	523 Shim
3 Pinion shaft	31 Key	114 Multi-tang washer	533 Shim
4 Gear	37 Anti-friction bearing	116 Thread lock	534 Shim
5 Pinion shaft	39 Circlip	119 Spacer	535 Shim
6 Gear	42 Anti-friction bearing	131 Closing cap	536 Shim
7 Output shaft	43 Key	132 Circlip	537 Shim
8 Key	45 Anti-friction bearing	133 Spacer	538 Shim
9 Oil seal	59 Screw plug	135 Nilos ring	542 Shim
11 Anti-friction bearing	83 Nilos ring	161 Closing cap	543 Shim
12 Circlip	84 Nilos ring	506 Shim	544 Shim
17 Spacer	88 Circlip	507 Shim	
19 Key	89 Closing cap	508 Shim	
20 Breather valve	100 Gearcase cover	521 Shim	
22 Gearcase	101 Hex head screw	521 Shim	

3.4 Basic structure of helical-worm gear units

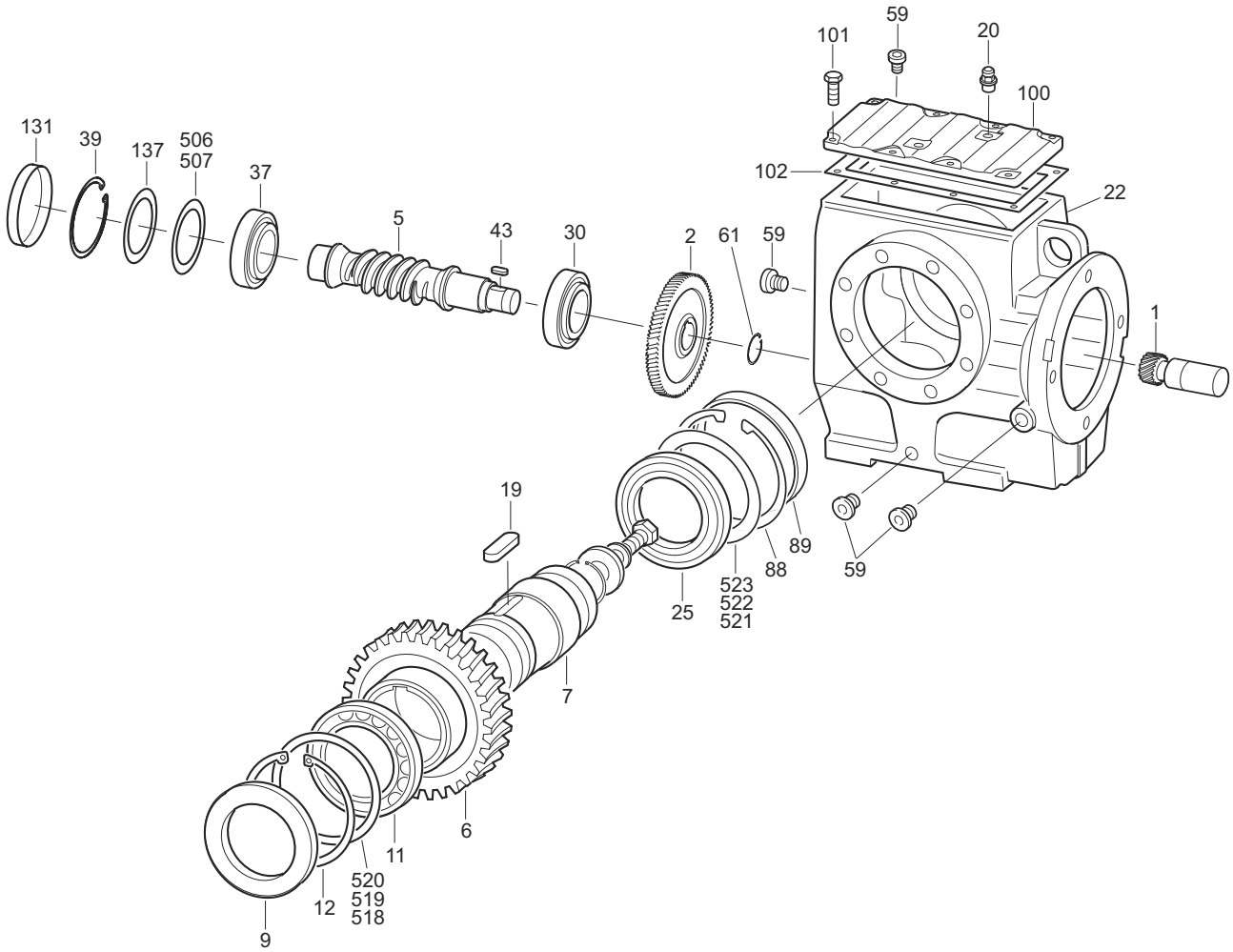

Figure 4: Basic structure of helical-worm gear units

Legend

1	Pinion	20	Breather valve	88	Circlip	518	Shim
2	Gear	22	Gearcase	89	Closing cap	519	Shim
5	Worm	25	Anti-friction bearing	100	Gearcase cover	520	Shim
6	Worm gear wheel	30	Anti-friction bearing	101	Hex head screw	521	Shim
7	Output shaft	37	Anti-friction bearing	102	Rubber seal	522	Shim
9	Oil seal	39	Circlip	131	Closing cap	523	Shim
11	Anti-friction bearing	43	Key	137	Spacer		
12	Circlip	59	Screw plug	506	Shim		
19	Key	61	Circlip	507	Shim		

3.5 Basic structure of SPIROPLAN® gear units

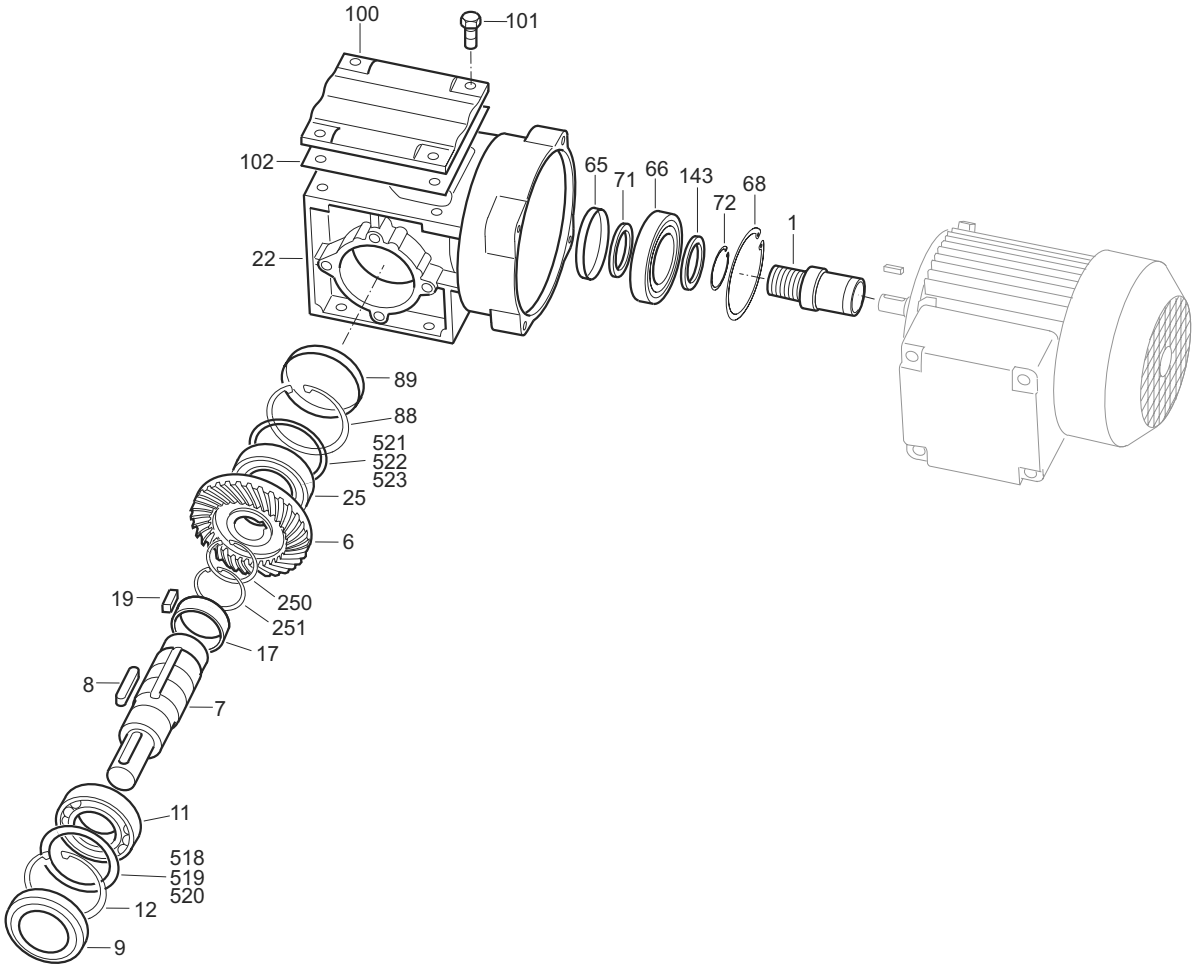

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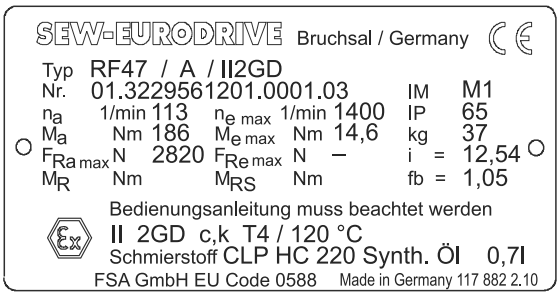
Figure 5: Basic structure of SPIROPLAN® gear units

Legend

1	Pinion	19	Key	88	Circlip	251	Circlip
6	Gear	22	Gearcase	89	Closing cap	518	Shim
7	Output shaft	25	Anti-friction bearing	100	Gearcase cover	519	Shim
8	Key	65	Oil seal	101	Hex head screw	520	Shim
9	Oil seal	66	Anti-friction bearing	102	Seal	521	Shim
11	Anti-friction bearing	71	Spacer	132	Circlip	522	Shim
12	Circlip	72	Circlip	183	Oil seal	523	Shim
17	Spacer	143	Spacer	250	Circlip		

3.6 Nameplate, unit designation

Sample nameplate


SEW-EURODRIVE Bruchsal / Germany
Typ RF47 / A / II2GD
Nr. 01.3229561201.0001.03
IM M1
IP 65
kg 37
i = 12,54
fb = 1,05
Bedienungsanleitung muss beachtet werden
II 2GD c,k T4 / 120 °C
Schmierstoff CLP HC 220 Synth. Öl 0,7l
FSA GmbH EU Code 0588 Made in Germany 117 882 2.10

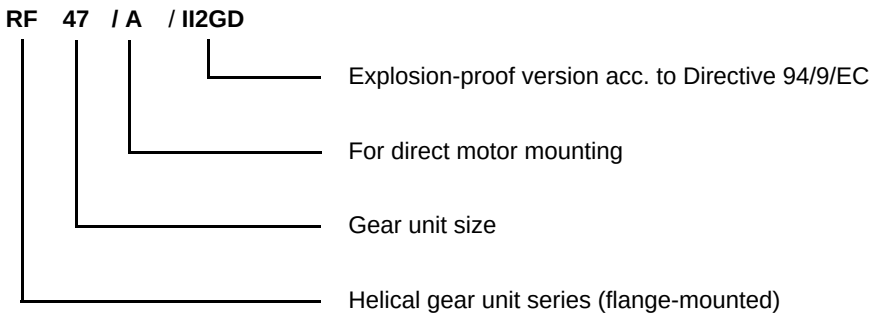
06687ADE

Figure 6: Sample nameplate

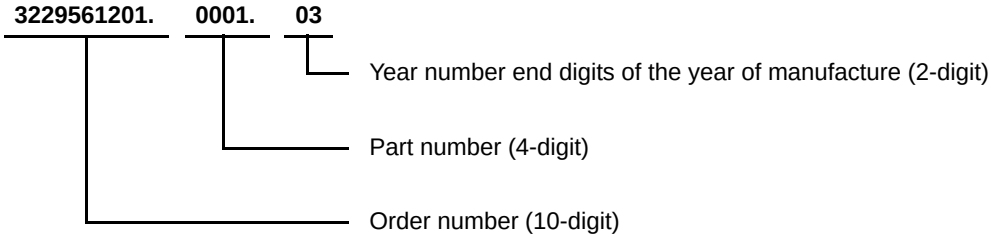
f_b		= Service factor
F_{Ramax}	[N]	= Maximum overhung load on output end
F_{Remax}	[N]	= Maximum overhung load on input end (with AD input shaft assembly)
i		= Gear unit reduction ratio
IM		= Mounting position entry
IP..		= Enclosure
n_{emax}	[rpm]	= Maximum input speed
n_a	[rpm]	= Output speed
M_{emax}	[Nm]	= Maximum input torque
M_a	[Nm]	= Output torque
M_R	[Nm]	= Slip torque when using AR adapter
M_{RS}	[Nm]	= Blocking torque of the backstop

Unit designation

Example: Helical gear unit category II2GD


RF 47 / A / II2GD
Explosion-proof version acc. to Directive 94/9/EC
For direct motor mounting
Gear unit size
Helical gear unit series (flange-mounted)

Example: Serial number



4 Mechanical Installation

4.1 Required tools / aids

- Set of spanners
- Torque wrench for:
  - Shrink disks
  - Motor flange AQH
  - Input shaft assembly with centering shoulder
- Mounting device
- Shims and distance rings if necessary
- Fixing devices for input and output elements
- Lubricant (e.g. NOCO® Fluid)
- Bolt locking compound (for input shaft assembly with centering shoulder), e.g. Loctite 243
- The delivery does not include standard parts

Installation tolerances

Shaft end	Flanges
Diameter tolerance in accordance with DIN 748 • ISO k6 for solid shafts with ∅ ≤ 50 mm • ISO m6 for solid shafts with ∅ > 50 mm • ISO H7 for hollow shafts • Center bore in accordance with DIN 332, shape DR	Centering shoulder tolerance in accordance with DIN 42948 • ISO j6 with b1 ≤ 230 mm • ISO h6 at b1 > 230 mm

4.2 Prerequisites for assembly

Check that the following points are met:

- The entries on the nameplate of the gearmotor match the voltage supply system.
- The drive has not been damaged during transport or storage.
- Make certain that the following requirements have been met:
  - Ambient temperature according to the table of lubricants in Sec. Lubricants (see standard).
    The drives are not allowed to be installed under the following ambient conditions:
    - Potentially explosive atmosphere
    - Oils
    - Acids
    - Gases
    - Vapors
    - Radiated interference
  - **With helical-worm / SPIROPLAN® W gear units:**
    No large external mass moments of inertia are permitted that could exert a retro-driving load on the gear unit.
    [At $\eta\prod$ (retrodriving) = 2 – 1/η < 0.5 self-locking]
- You must thoroughly clean anti-corrosion agents, contamination and the like off output shafts and flange surfaces. Use a commercially available solvent. Do not let the solvent come into contact with the sealing lips of the oil seals – danger of damage to the material!
- If the ambient conditions are aggressive, protect the oil seals on the output end against wear.

4.3 Installing the gear unit

The gear unit or gearmotor is only allowed to be installed in the specified mounting position. SPIROPLAN® gear units do not change regardless of their mounting position.

The support structure must have the following features:

- Flat
- Vibration damping
- Torsionally rigid

Maximum permitted flatness error for foot and flange-mounting (approximate values with reference to DIN ISO 1101):

- Gear unit size ≤ 67: Max. 0.4 mm
- Gear unit size 77 – 107: Max. 0.5 mm
- Gear unit size 137 – 147: Max. 0.7 mm
- Gear unit size 157 – 187: Max. 0.8 mm

Do not tighten the housing legs and mounting flanges against one another and comply with the permitted overhung and axial loads!

Secure gearmotors using quality 8.8 screws.

Secure the following gearmotors using quality 10.9 screws:

- RF37, R37F with flange ∅ 120 mm
- RF47, R47F with flange ∅ 140 mm
- RF57, R57F with flange ∅ 160 mm

The oil checking and drain screws and the breather valves must be freely accessible!

Before startup, check that the oil fill is in accordance with the mounting position! (→ Sec. "Lubricants", entries on the nameplate)

You must contact SEW-EURODRIVE first before changing the mounting position. Failure to contact us will invalidate the ATEX certification!

Use plastic inserts (2 – 3 mm thick) if there is a risk of electrochemical corrosion between the gear unit and the driven machine. The plastic used must have an electric shunt resistance < 10^9 Ω. Electrochemical corrosion can occur between different metals such as cast iron and high-grade steel. Also fit the screws with plastic washers! Ground the housing using the grounding bolts on the motor.

Installation in damp locations or in the open

Drives are supplied in corrosion-resistant versions for use in damp areas or in the open air. Touch up any paint damage that has occurred (e.g. on breather valve).

When installing motors on adapters AM, AQ, AR, seal the flange surfaces using a suitable sealing compound such as LOCTITE 574.

Gear unit venting

No breather plug is required for the following gear units:

- R07 in mounting positions M1, M2, M3, M5 and M6
- R17, R27 and F27 in mounting positions M1, M3, M5 and M6
- SPIROPLAN® W gear units

SEW-EURODRIVE supplies all other gear units with an activated breather valve fitted appropriately for the mounting position.

Exceptions:

1. SEW-EURODRIVE supplies the following gear units with a screw plug in the vent hole provided in the gear unit:
   - Gear units for extended storage
   - Pivoted mounting positions, if possible
   - Gear units for mounting on a slant

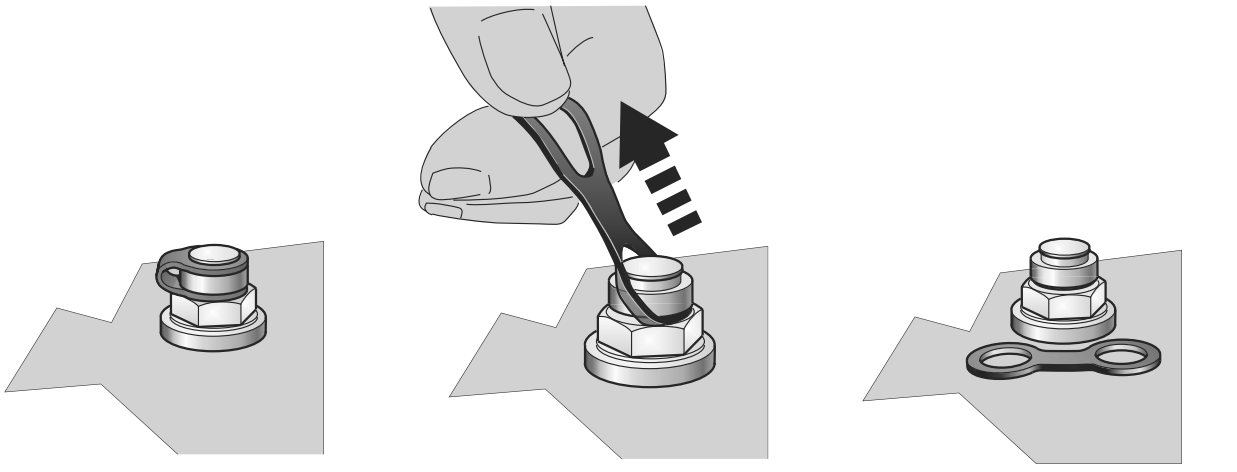
   The breather valve is located in the motor terminal box. Prior to startup, you must remove the screw plug located at the highest point and screw in the supplied breather valve in its place.
2. With **gear head units** requiring venting on the input end, SEW-EURODRIVE supplies a breather valve in a plastic bag.
3. SEW-EURODRIVE supplies **enclosed gear units** without a breather valve.

Only authorized people are allowed to assemble **gear head units** with motors or adapters. Please contact SEW-EURODRIVE.

Activating the breather valve

As a rule, the breather valve is already activated at the factory. If the breather valve is not activated, you must remove the transport fixture from the breather valve before starting up the gear unit!

1. Breather valve with transport fixture
2. Remove the transport fixture
3. Breather valve activated



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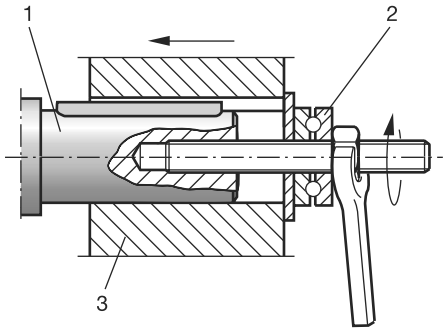
Painting the gear unit

If you paint over all or part of the drive, please take care to mask the breather valve and oil seals carefully. Remove the masking tape once you have completed the painting work.

4.4 Gear unit with solid shaft

Installing input and output elements

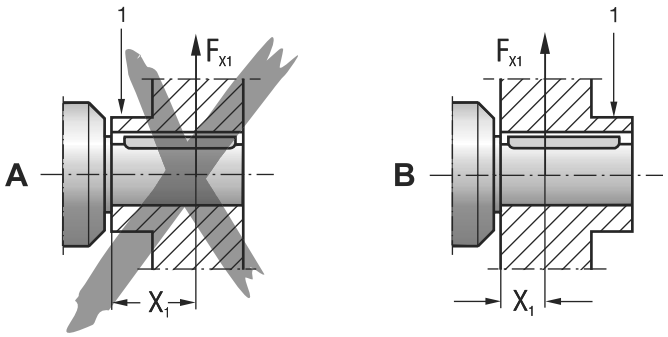
The following figure shows a mounting device for installing couplings or hubs on gear unit or motor shaft ends. It may be possible to dispense with the thrust bearing on the mounting device.



1) Gear shaft end
2) Thrust bearing
3) Coupling hub

03371BXX

To avoid impermissibly high overhung loads: Install gears or sprockets as shown in Fig. **B**.



1 = Hub

A = Unfavorable
B = Correct

03369BXX

Only ATEX-approved input and output elements are allowed to be used, assuming the elements are subject to Directive 94/9/EC.

- Only use a mounting device for installing input and output elements. Use the center bore and the thread on the shaft end for positioning purposes.

- **Never strike belt pulleys, couplings, pinions, etc. with a hammer when pulling them onto the shaft end. This could result in damage to bearings, the housing and the shaft!**
- **In the case of belt pulleys, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions.**
- **Only belts with a sufficient electric shunt resistance < 10^9 Ω are allowed to be used.**
- The requirements in of IEC 60695-11-10, category FV-0 must be met.
- Power transmission elements should be balanced after fitting and must not give rise to any impermissible radial or axial forces (see the "Gearmotors" or "Explosion-Proof Drives" catalog for permitted values).

Note:

Mounting is easier if you first apply lubricant to the output element or heat it up briefly (to 80 – 100 °C).

Mounting of couplings

Couplings must be mounted and balanced according to the information provided by the coupling manufacturer:

a) Maximum and minimum clearance

b) Axial misalignment

c) Angular misalignment

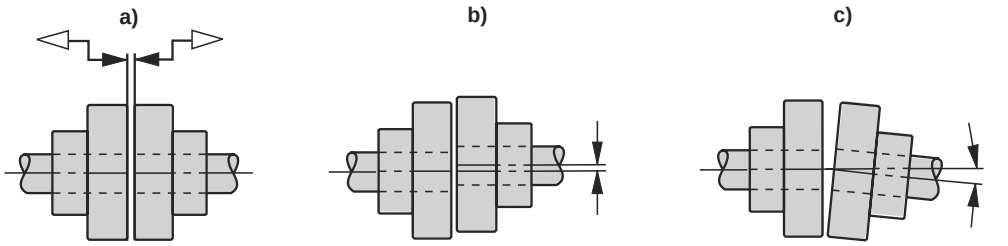


Figure 7: Clearance and misalignment for clutch mounting

Input and output elements such as belt pulleys, couplings, etc. must have protection against contact!

4.5 Installing gear units in potentially explosive atmospheres

When installing the gear unit in a potentially explosive atmosphere, it is essential that you comply with the safety notes in Sec. 2!

4.6 Gear units and gearmotors in category II2GD

- Explosion-proof gear units and gearmotors in R, F, K, W and S series comply with the design requirements for unit group II, categories 2G (potentially explosive gas atmosphere) and 2D (potentially explosive dust atmosphere). These units are intended for use in zones 1 and 21.
- **Do not operate gear units and gearmotors in W10.. series in a potentially explosive atmosphere.**

Explosion-proof gear units in series R, F, K and S with type AR adapter (adapter with torque limiting coupling) comply with unit group II, categories 3G (potentially explosive gas atmosphere) and 3D (potentially explosive dust atmosphere). These units are intended for use in zones 2 and 22.

Ambient temperature

Use gear units in category II2D at ambient temperatures of –20 °C to +40 °C only.

If the ambient temperatures are different from these, they must be identified accordingly on the nameplate.

Temperature class

Mains-operated gear units / gearmotors in category II2G (potentially explosive gas atmosphere) are approved for temperature classes T3 to T6 depending on their speed, reduction ratio and mounting position. The temperature class of the gear unit is indicated on the nameplate. The situation for single gear units and inverter-operated gearmotors (only 4 and 6 pole) is defined depending on the application, subject to consultation with SEW-EURODRIVE.

Surface temperature

The maximum surface temperature of gear units in category II2D is 120 °C or 140 °C depending on their speed, reduction ratio and mounting position. Lower surface temperatures are only permitted subject to consultation with SEW-EURODRIVE and must be indicated on the nameplate. The plant owner must ensure that any possible dust buildup does not exceed a maximum thickness of 5 mm in accordance with EN 50281-1-2.

Enclosure	All gear unit versions comply with enclosure IP65 in accordance with EN 60529.
Ambient conditions	Measures must be taken to ensure that the gear units are sufficiently ventilated and that they are not subject to heating from an external source (e.g. via couplings).
Output power and output torque	Measures must be taken to ensure that the output torque and the permitted overhung loads are complied with.
Special designs	Special designs (e.g. modified output shaft) are only allowed to be used in a potentially explosive atmosphere subject to authorization from SEW-EURODRIVE.

4.7 Torque arms for shaft-mounted gear units

Do not place torque arms under strain during installation!

Parallel shaft helical gear unit

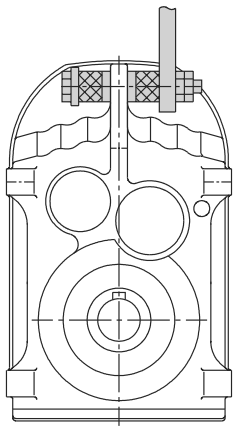


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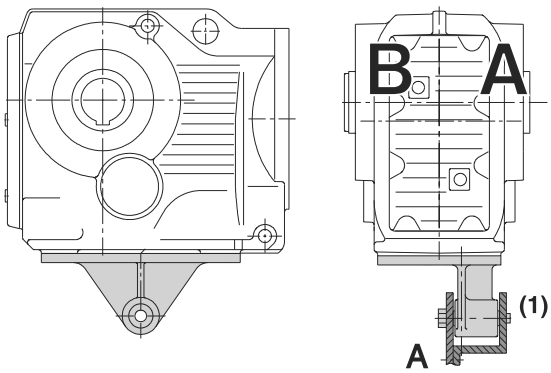
Figure 8: Torque arm for parallel shaft helical gear unit

Helical-bevel gear unit

- Bushing with bearings on both ends → (1)
- Install connection end B as a mirror image of A



01030CXX

Figure 9: Torque arm for helical-bevel gear units

Gear unit	Bolts	Tightening torque
KA37	4 × M10 × 25 – 8.8	48 Nm
KA47	4 × M10 × 30 – 8.8	48 Nm
KA67	4 × M12 × 35 – 8.8	86 Nm
KA77	4 × M16 × 40 – 8.8	210 Nm
KA87	4 × M16 × 45 – 8.8	210 Nm
KA97	4 × M20 × 50 – 8.8	410 Nm
KA107	4 × M24 × 60 – 8.8	710 Nm
KA127	4 × M36 × 130 – 8.8	2500 Nm
KA157	4 × M36 × 130 – 8.8	2500 Nm

Helical-worm gear unit

- Bushing with bearings on both ends → (1)

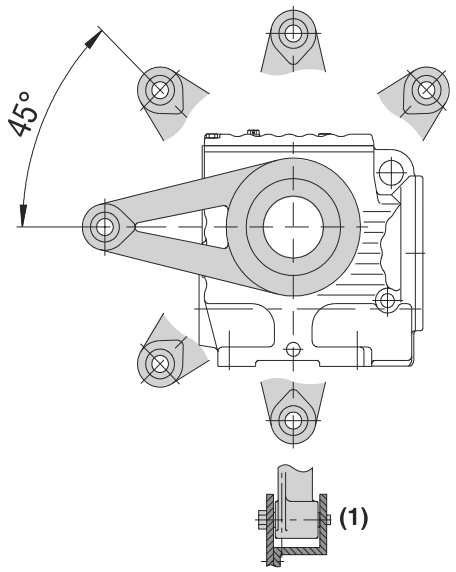


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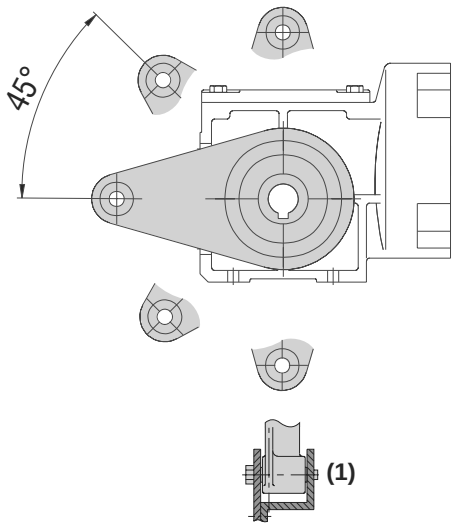
Figure 10: Torque arm for helical-worm gear units

Gear unit	Bolts	Tightening torque
SA37	M6 × 16 – 8.8	11 Nm
SA47	M8 × 20 – 8.8	25 Nm
SA57	M8 × 20 – 8.8	25 Nm
SA67	M12 × 25 – 8.8	86 Nm
SA77	M12 × 35 – 8.8	86 Nm
SA87	M16 × 35 – 8.8	210 Nm
SA97	M16 × 35 – 8.8	210 Nm

SPIROPLAN® W gear unit

- Bushing with bearings on both ends → (1)



02050CXX

Figure 11: Torque arm for SPIROPLAN® W gear units

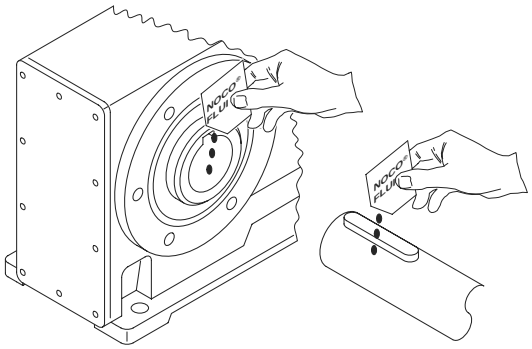
Gear unit	Bolts	Tightening torque
WA10	M6 × 16	11 Nm
WA20	M6 × 16	11 Nm
WA30	M6 × 16	11 Nm

4.8 Shaft-mounted gear unit with keyway or splined hollow shaft

Concerning the configuration of the customer shaft, please also refer to the design notes in the Gearmotors catalog!

Installation notes

1. Apply NOCO® fluid.



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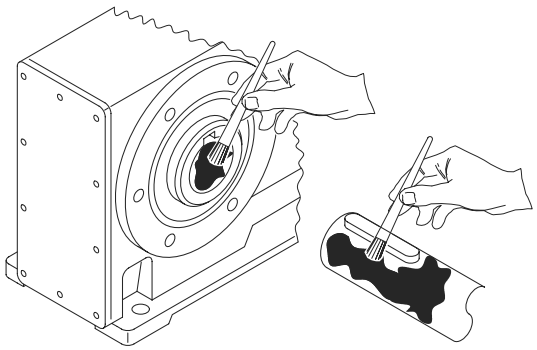
2. Distribute the NOCO® fluid carefully.



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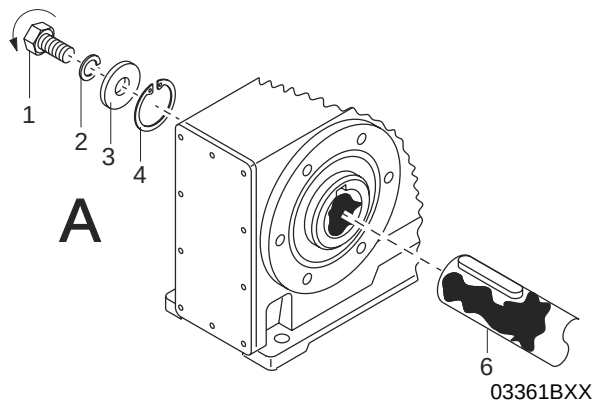
3. Install the shaft and secure it axially
   (mounting is facilitated by using a mounting device).
   3A: Mounting with standard scope of supply



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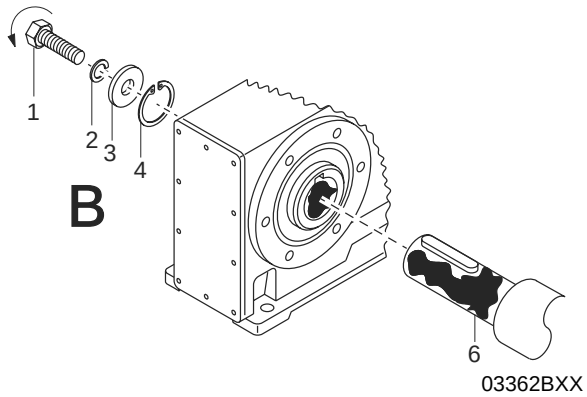
1 Short retaining screw (standard scope of supply)
2 Lock washer
3 Washer
4 Circlip
6 Customer shaft

3B: Mounting with SEW-EURODRIVE installationy/removal kit (→ page 32)

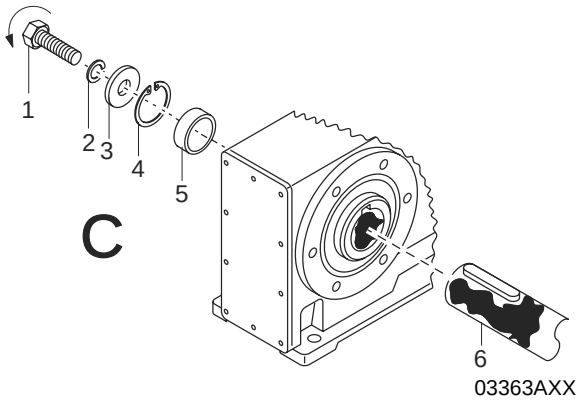
– Customer shaft **with** contact shoulder



1 Retaining screw
2 Lock washer
3 Washer
4 Circlip
6 Customer shaft with contact shoulder

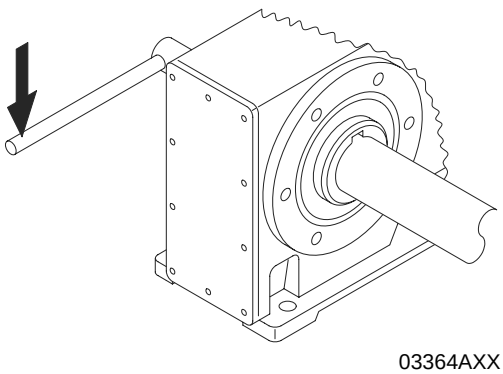
3C: Mounting with SEW-EURODRIVE installation/removal kit (→ page 32)

– Customer shaft **without** contact shoulder



1 Retaining screw
2 Lock washer
3 Washer
4 Circlip
5 Spacer
6 Customer shaft without contact shoulder

4. Tighten the retaining screw to the appropriate torque (see table).



Bolt	Tightening torque [Nm]
M5	5
M6	8
M10/12	20
M16	40
M20	80
M24	200

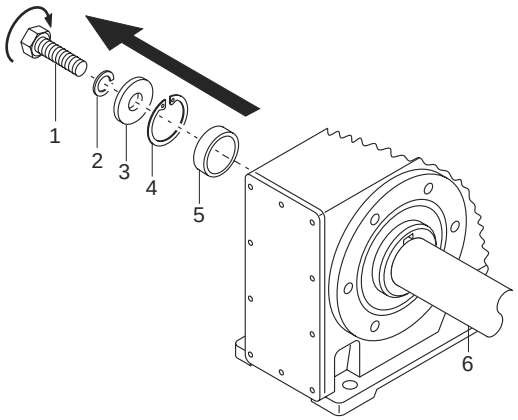
Note:

To avoid contact corrosion, we recommend that the customer shaft should additionally be recessed between the two contact surfaces!

Information about disassembly

Description applies only if gear unti was installed using the SEW-EURODRIVE installation/removal kit (→ page 32) (see previous description, item 3B or 3C).

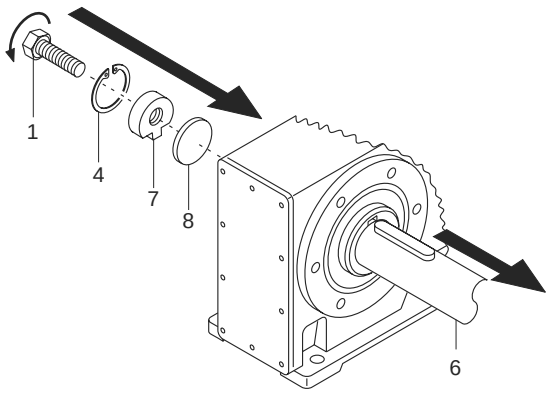
1. Loosen the retaining screw 1.
2. Remove parts 2 to 4 and, if fitted, distance piece 5.



1 Retaining screw
2 Lock washer
3 Washer
4 Circlip
5 Spacer
6 Customer shaft

03366AXX

3. Insert the forcing disk 8 and the fixed nut 7 from the SEW-EURODRIVE installation/removal kit between the customer shaft 6 and the circlip 4.
4. Re-insert the circlip 4.
5. Screw the retaining screw 1 back in. Now you can force the gear unit off the shaft by tightening the screw.



1 Retaining screw
4 Circlip
6 Customer shaft
7 Fixed nut
8 Forcing washer

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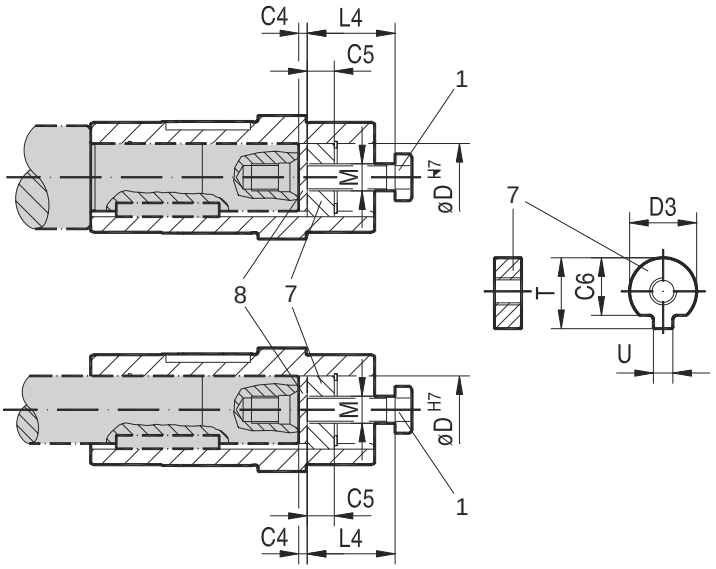
SEW installation/removal kit

The SEW-EURODRIVE installation/removal kit can be ordered by quoting the specified part number.



03394CXX

Figure 12: SEW-EURODRIVE installation/removal kit

1 Retaining screw
7 Fixed nut for disassembly
8 Forcing washer

Type	D^{H7} [mm]	M[1)]	C4 [mm]	C5 [mm]	C6 [mm]	$U^{-0.5}$ [mm]	$T^{-0.5}$ [mm]	$D3^{-0.5}$ [mm]	L4 [mm]	Part number of installation/removal kit
WA..20	18	M6	5	6	13.5	5.5	20.5	17.7	25	643 682 X
WA..20, WA..30, SA..37	20	M6	5	6	15.5	5.5	22.5	19.7	25	643 683 8
FA..27, SA..47	25	M10	5	10	20	7.5	28	24.7	35	643 684 6
FA..37, KA..37, SA..47, SA..57	30	M10	5	10	25	7.5	33	29.7	35	643 685 4
FA..47, KA..47, SA..57	35	M12	5	12	29	9.5	38	34.7	45	643 686 2
FA..57, KA..57, FA..67, KA..67, SA..67	40	M16	5	12	34	11.5	41.9	39.7	50	643 687 0
SA..67	45	M16	5	12	38.5	13.5	48.5	44.7	50	643 688 9
FA..77, KA..77, SA..77	50	M16	5	12	43.5	13.5	53.5	49.7	50	643 689 7
FA..87, KA..87, SA..77, SA..87	60	M20	5	16	56	17.5	64	59.7	60	643 690 0
FA..97, KA..97, SA..87, SA..97	70	M20	5	16	65.5	19.5	74.5	69.7	60	643 691 9
FA..107, KA..107, SA..97	90	M24	5	20	80	24.5	95	89.7	70	643 692 7
FA..127, KA..127	100	M24	5	20	89	27.5	106	99.7	70	643 693 5
FA..157, KA..157	120	M24	5	20	107	31	127	119.7	70	643 694 3

1) Retaining screw

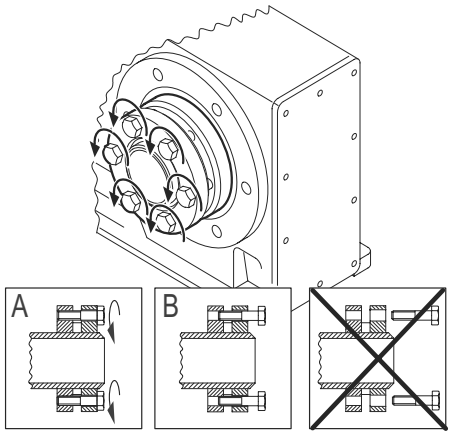
The SEW installation kit for attaching the customer shaft is a recommendation by SEW-EURODRIVE. Always check that this structure can compensate for the existing axial forces. In special applications (e.g. attaching agitator shafts) it may be necessary to use a different structure for securing axially. In such cases, customers can always use axial securing fixtures that they have developed themselves. However, measures must be taken to ensure that this structure does not give rise to any potential sources of combustion in accordance with DIN EN 13463 (e.g. impact sparks).

4.9 Shaft-mounted gear unit with shrink disk

Installation notes

- Do not tighten the locking screws unless the shaft is installed – the hollow shaft could become deformed!

1. Loosen the locking screws a few turns (do not unscrew completely!).



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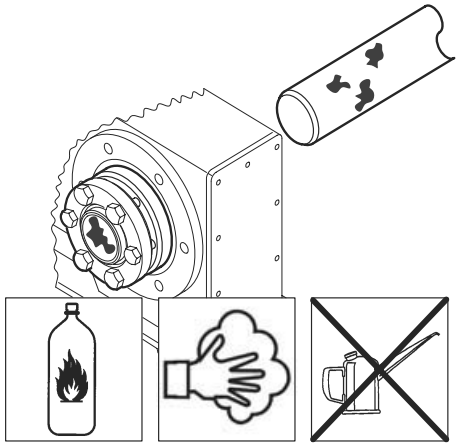
2. Carefully degrease the hollow shaft hole and the input shaft.



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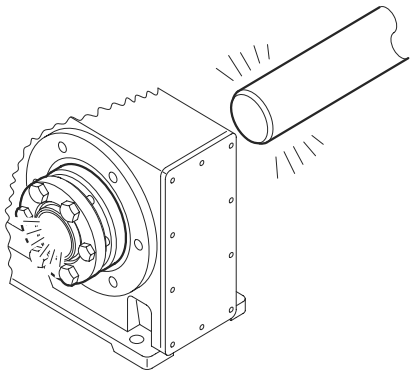
3. Hollow shaft/input shaft after degreasing



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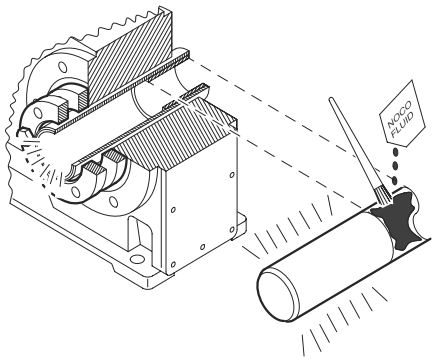
4. Apply NOCO® fluid to the input shaft[1] in the area of the bushing. .



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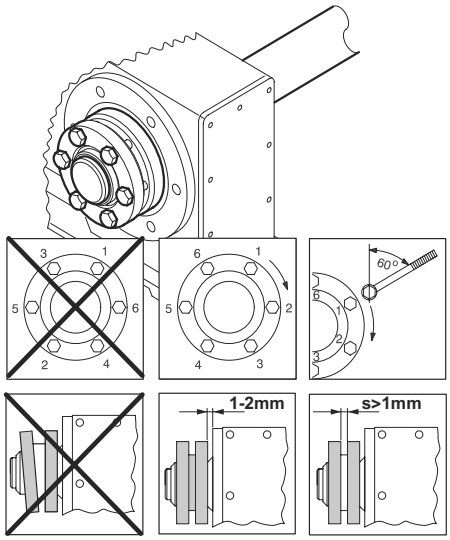
1) Make sure that the clamping area of the shrink disk is free from grease! As a result, never apply NOCO® fluid directly to the bushing. This is because the paste may be able to get into the clamping area of the shrink disk when the input shaft is put on.

5. Install the input shaft, making sure that the locking collars of the shrink disk are equally spaced[2)]. If the gearcase has a shaft shoulder, install the **shrink disk onto the stop on the shaft shoulder**. If the gearcase does not have a shaft shoulder, install the **shrink disk at a distance of 1 to 2 mm from the gearcase**. Use a torque wrench to tighten the locking screws by working round several times from one screw to the next (not in diametrically opposite sequence) until the screws cannot be turned any further. See the following table for tightening torques.



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2) **After assembly,**

- there must be a residual gap s > 1 mm between the outer rings
- grease the outside of the hollow shaft in the area of the shrink disk. This is in order to prevent corrosion.

Gear unit type			Bolt	Nm	◁ max.[1)]
		SH37	M5	5	60°
KH37...77	FH37...77	SH47...77	M6	12	
KH87/97	FH87/97	SH87/97	M8	30	
KH107	FH107		M10	59	
KH127/157	FH127		M12	100	
KH167			M16	250	
KH187			M20	470	

1) Maximum tightening angle per cycle

Notes on removal of the shrink disk

1. Loosen the locking screws evenly one after the other. Each locking screw may only be loosened by about one quarter turn in the initial cycle. This is in order to avoid tilting and jamming the locking collars. Do not fully unscrew the locking screws!
2. Remove the shaft or pull the hub off the shaft. (It is first necessary to remove any rust which may have formed between the hub and the end of the shaft.)
3. Pull the shrink disk off the hub.

Caution!

Risk of injury if the shrink disk is not removed correctly!

Cleaning and lubricating the shrink disk

There is no need to strip down and re-grease the removed shrink disks before they are installed again.

The shrink disk only needs to be cleaned and re-greased if it is contaminated.

Use one of the following solid lubricants for the tapered surfaces:

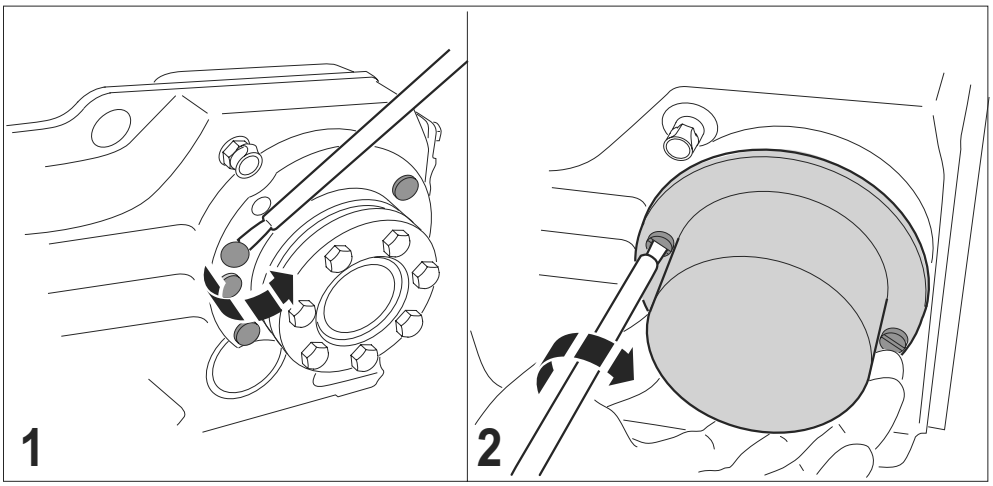
Lubricant (Mo S2)	Sold as
Molykote 321 (lube coat)	Spray
Molykote spray (powder spray)	Spray
Molykote G Rapid	Spray or paste
Aemasol MO 19P	Spray or paste
AemasolDIO-sétral 57 N (lube coat)	Spray

Grease the locking screws with a multipurpose grease such as Molykote BR 2 or similar.

Installing the hood cover

Before installing, make sure that

- the adhesive connection between the seal and the hood cover is correct
- that the holes in the seal and hood cover are lined up



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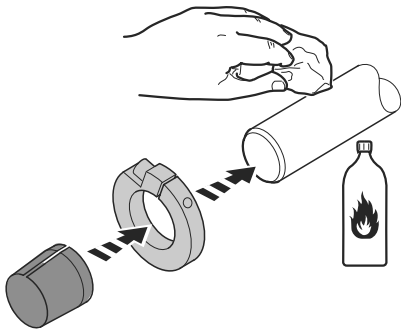
1. Remove the plastic plugs from the gearcase to attach the hood cover (→ Fig. 1).
2. Attach the hood cover to the gearcase using the supplied screws (→ Fig. 2).

In special applications such as pass-through shafts, you cannot attach the hood cover. In such cases, it is possible to dispense with the hood cover if the machine or equipment manufacturer fits appropriate add-on parts to ensure that the degree of protection demanded in DIN EN 13463 is provided.

Where this means that special maintenance measures are necessary, you must describe them in the operating instructions for the machine or component.

4.10 Shaft-mounted gear unit with TorqLOC®

1. Clean the inside of the hollow shaft and the customer shaft carefully. Make sure that all grease or oil residue has been removed.
2. Install the stop ring and the bushing on the customer shaft.



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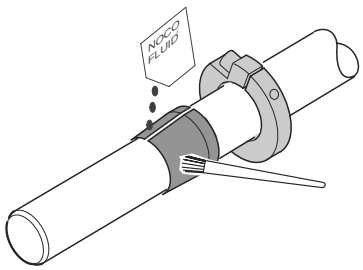
3. Apply NOCO® fluid to the bushing and distribute it carefully.



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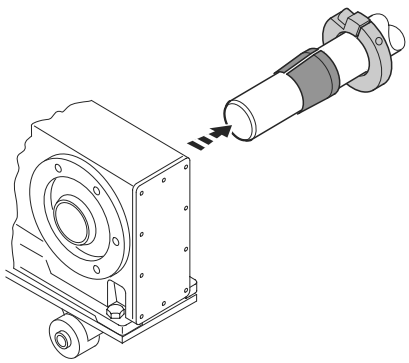
4. Push the gear unit onto the customer shaft.



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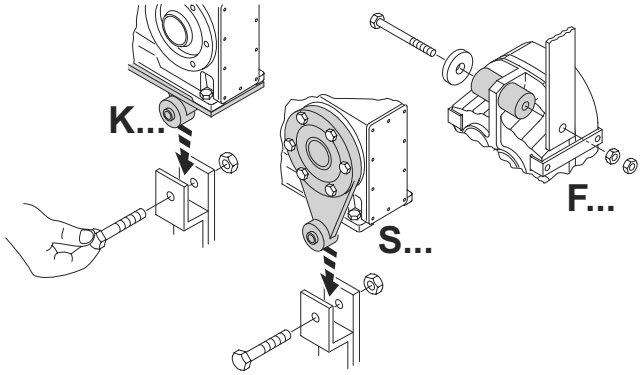
5. Preassemble the torque arm (do not tighten the screws).



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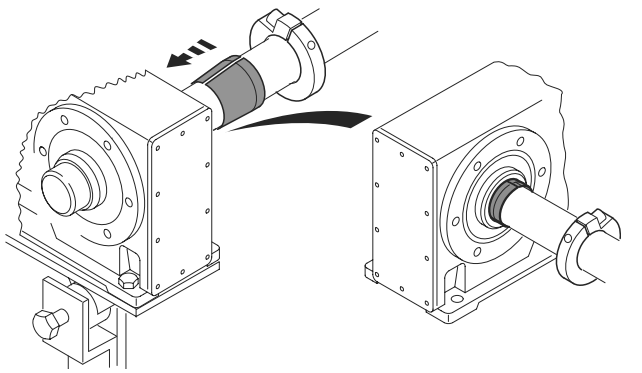
6. Push the bushing into the gear unit up to the stop.



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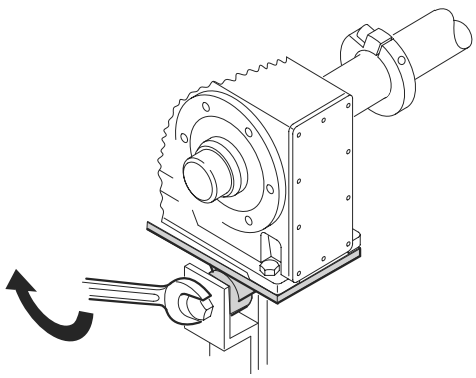
7. Tighten all retaining screws on the torque arm.



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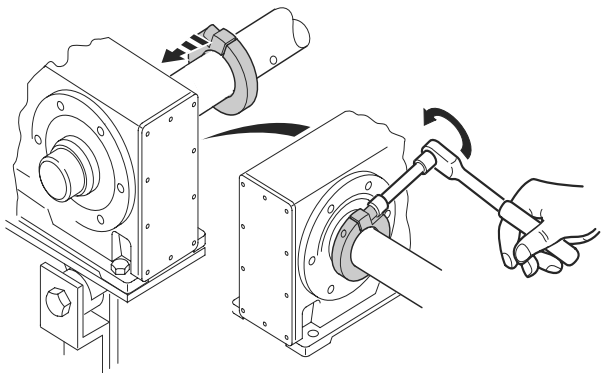
8. Secure the bushing with the stop ring. Tighten the stop ring onto the bushing to the corresponding torque given in the following table.



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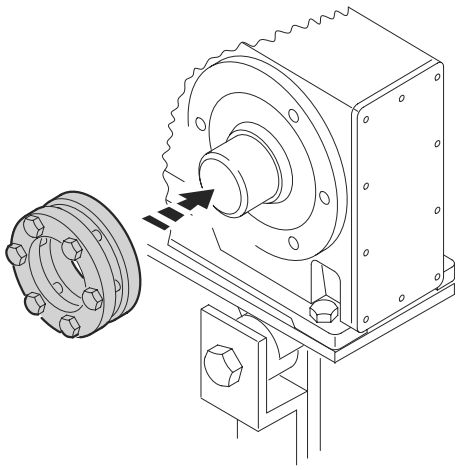
Type		Torque in [Nm]	
KT/FT	ST	Nickel-plated	Stainless steel
-	37	18	7.5
37	47	18	7.5
47	57	18	7.5
57, 67	67	35	18
77	77	35	18
87	87	35	18
97	97	35	18

9. Slide the shrink disk onto the hollow shaft. Make sure that all screws are loosened.



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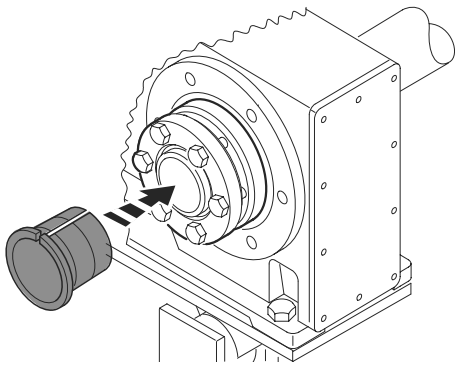
10. Push the counter bushing onto the customer shaft and into the hollow shaft or shrink disk all the way to the seat.



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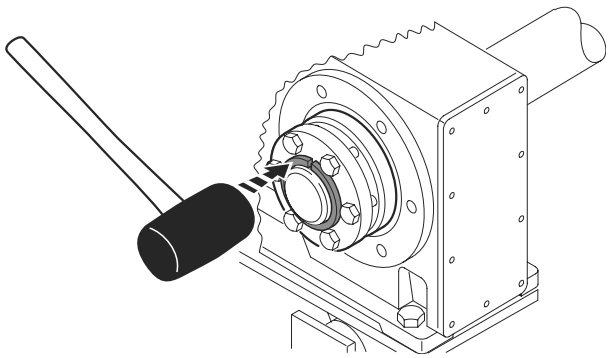
11. Lightly tap the flange of the counter bushing to ensure that the bushing is securely seated in the hollow shaft.



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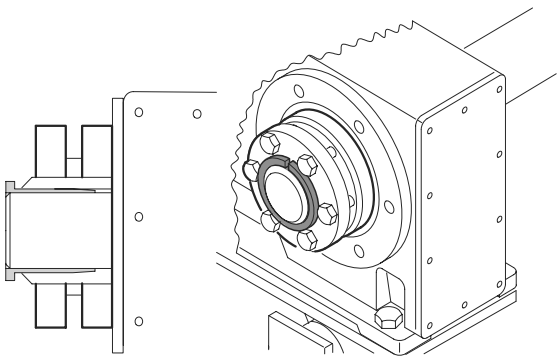
12. Make sure that the customer shaft is seated in the counter bushing.



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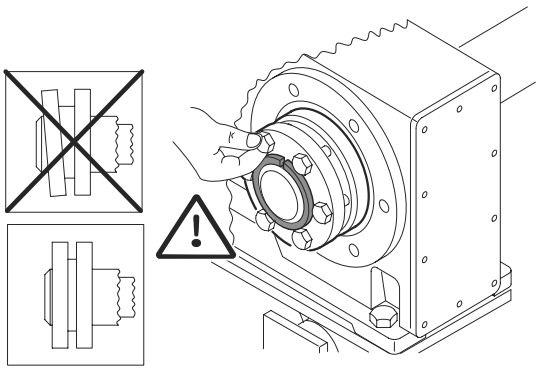
13. Tighten the screws of the shrink disk until finger-tight and make sure that the collar rings of the shrink disk are parallel.



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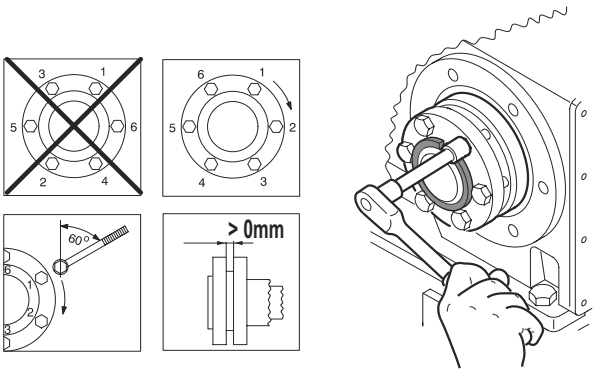
14. Tighten the locking screws by working round several times from one screw to the next (not in diametrically opposite sequence). See the table for tightening torques.

After installation, the remaining gap between the outer rings of the shrink disks must be > 0 mm.



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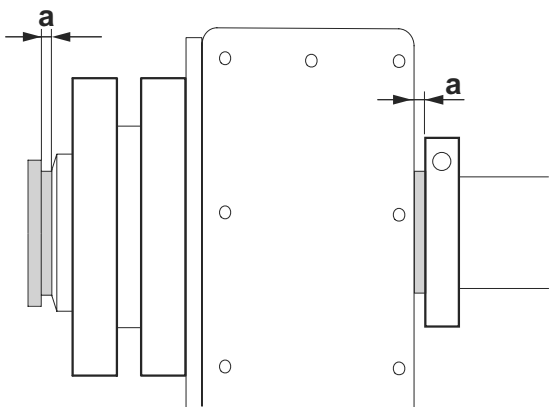
Type		Nickel-plated	Stainless steel
KT/FT	ST	Torque in [Nm]	
-	37	4.1	6.8
37	47	10	6.8
47	57	12	6.8
57, 67	67	12	15
77	77	30	30
87	87	30	50
97	97	30	50

15. The distance between the counter bushing and the end of the hollow shaft as well as the stop ring bushing and clamping ring must not exceed the following values. The following table shows the maximum and minimum gap width.



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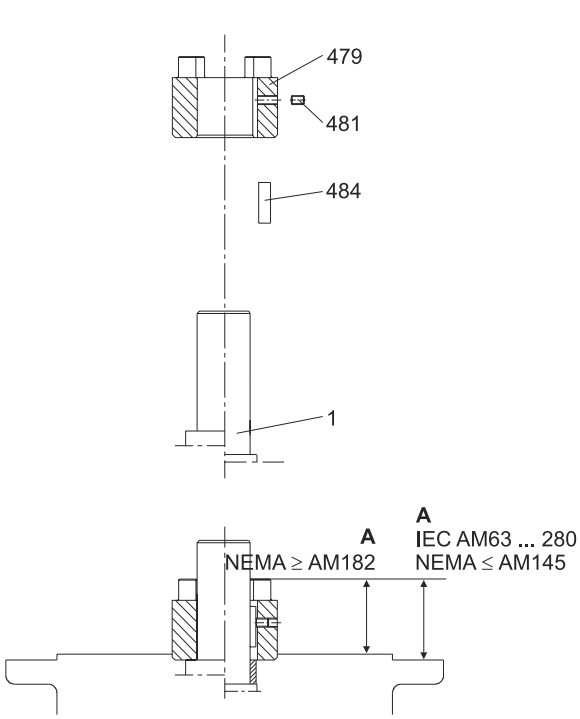
Type		Distance [mm]	
KT/FT	ST	a min.	a max.
-	37	3.3	5.6
37	47	3.3	5.6
47	57	5.0	7.6
57, 67	67	5.0	7.6
77	77	5.0	7.6
87	87	5.8	8.6
97	97	5.8	8.6

4.11 Coupling of AM adapter

IEC adapter AM63 - 225 / NEMA adapter AM56 - 365



1. Clean the motor shaft and flange surfaces of the motor and the adapter.
2. Remove the key from the motor shaft and replace it with the supplied key (484) (not AM63 and AM250).
3. Heat the coupling half (479) to approx. 80 – 100 °C, push the coupling half onto the motor shaft.

   Up to the stop on the collar of the motor shaft (except for AM250 / AM280 and NEMA, position to dimension **A**).
4. Use threaded pin (481) to secure the key and coupling half on the motor shaft, tightening torque T_A according to table.
5. Check dimension **A**.
6. Use a suitable sealing compound to seal the contact surfaces between the adapter and the motor.
7. Mount the motor on the adapter. When doing this, make sure the coupling dogs of the adapter shaft engage in the plastic spider.

Do not insert spacer sleeves to facilitate assembly!

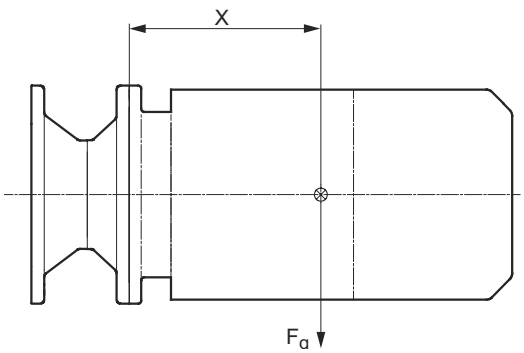
IEC AM	63 / 71	80 / 90	100 / 112	132	160 / 180	200	225	250 / 280
A	24.5	31.5	41.5	54	76	78.5	93.5	139
TA	1.5	1.5	4.8	4.8	10	17	17	17
Thread	M4	M4	M6	M6	M8	M10	M10	M10
NEMA AM	56	143 / 145	182 / 184	213 / 215	254 / 256	284 / 286	324 / 326	364 / 365
A	46	43	55	63.5	78.5	85.5	107	107
TA	1.5	1.5	4.8	4.8	10	17	17	17
Thread	M4	M4	M6	M6	M8	M10	M10	M10

To avoid contact corrosion, we recommend applying NOCO® fluid to the motor shaft before installing the coupling half.

When mounting a motor on the adapter, use an anaerobic fluid seal to ensure that no moisture can penetrate the adapter!

Permitted loads

The load data specified in the following table must not be exceeded by mounting a motor.



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Adapter type			F_q[1] [N]	
IEC	**NEMA**	**x[1] [mm]**	**IEC adapter**	**NEMA adapter**
AM63/71	**AM56**	77	530	410
AM80/90	**AM143/145**	113	420	380
AM100/112	**AM182/184**	144	2000	1760
AM132[2]	**AM213/215**[2]	186	1600	1250
AM132..	**AM213/215**		4700	3690
AM160/180	**AM254/286**	251	4600	4340
AM200/225	**AM324-AM365**	297	5600	5250
AM250/280	**-**	390	11200	-

1) The maximum permitted weight of the mount-on motor F_{qmax} must be reduced in direct proportion to the increase in the distance of the center of gravity x. No increase in the maximum permitted weight F_{qmax} is permitted when the distance of the center of gravity x is reduced.

2) Diameter of the adapter output flange: 160 mm

Adapter AM with backstop AM../RS

Check the direction of rotation of the drive before installation and startup. Please inform the SEW-EURODRIVE customer service if the direction of rotation is incorrect.

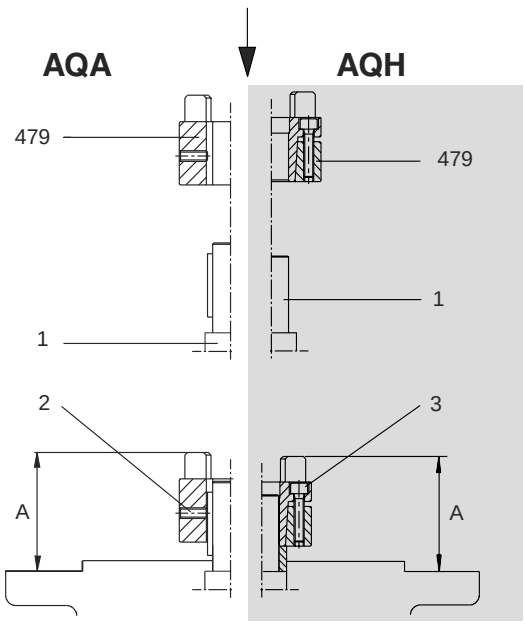
The backstop is maintenance-free in operation, and does not require any further maintenance work.

Backstops have minimum lift-off speeds depending on their size (→ following table). If the backstop speed is less than the minimum lift-off speed, it will operate with abrasion and the resulting friction will lead to high temperatures.

Type	Maximum locking torque of backstop [Nm]	Minimum lift-off speed [rpm]
AM80/90/RS, AM143/145/RS	90	640
AM100/112/RS, AM182/184/RS	340	600
AM132/RS, AM213/215/RS	700	550
AM160/180/RS, AM254/286/RS	1200	630
AM200/225/RS, AM324-365/RS	1450	430

The speed must not drop below the minimum lift-off speed during rated operation. The speed is only allowed to be less than the minimum lift-off speed during startup or braking.

4.12 Coupling of adapter AQ



1 Motor shaft
2 Setscrew
3 Bolt

AQA = With keyway
AQH = Without keyway

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1. Clean the motor shaft and flange surfaces of the motor and the adapter.
2. **Type AQH:** Unscrew the bolts of the coupling half (479) and loosen the conical connection.
3. Heat the coupling half (80 °C – 100 °C) and push it onto the motor shaft.

   Version AQA / AGH: up to clearance "A" (see table).
4. **Type AQH:** Tighten the bolts on the coupling half in diametrically opposite sequence (work round several times) until all bolts reach the tightening torque T_A specified in the table.

   Type AQA: Use a setscrew to secure the coupling half (see table).
5. Check the position of the coupling half (clearance "A", see table).

   Install the motor onto the adapter, making sure that the dogs of the two coupling halves engage in one another. The force which must be applied when joining the two coupling halves is dissipated after final assembly, so there is no risk of any axial load being applied to adjacent bearings.

- **Use of the adapter AQH in a potentially explosive atmosphere is not permitted!**
- **Do not insert spacer sleeves to facilitate assembly.**

Only with AQA, not permitted with AQH: To avoid contact corrosion, we recommend applying NOCO® fluid to the motor shaft before mounting the coupling half.

When mounting a motor on the adapter, use an anaerobic fluid seal to ensure that no moisture can penetrate the adapter!

Setting dimensions, tightening torques

Type	Coupling size	Clearance "A" [mm]	Bolts DIN 912		Tightening torque T_A [Nm]	
			AQA	AQH	AQA	AQH
AQA /AQH 80 /1/2/3	19/24	44.5	M5	M4	2	3
AQA /AQH 100 /1/2		39				
AQA /AQH 100 /3/4		53				
AQA /AQH 115 /1/2		62				
AQA /AQH 115 /3	24/28	62	M5	M5	2	6
AQA /AQH 140 /1/2		62				
AQA /AQH 140 /3	28/38	74.5	M8	M5	10	6
AQA /AQH 190 /1/2		76.5				
AQA /AQH 190 /3	38/45	100	M8	M6	10	10

4.13 Adapter with a torque limiting coupling AR

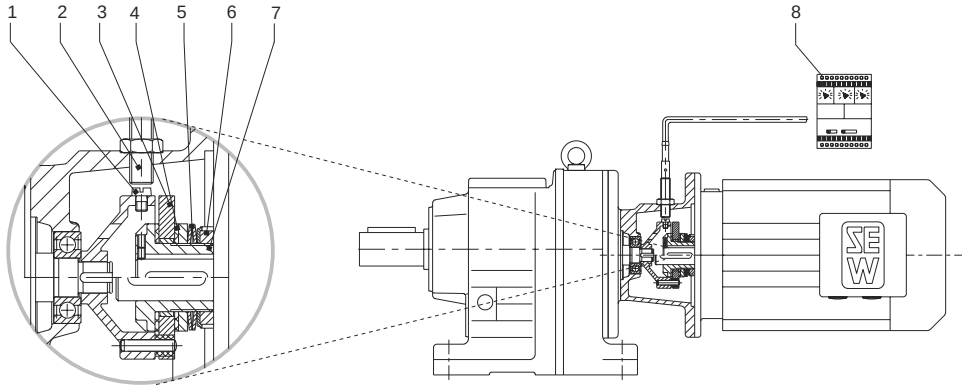


Figure 13: Drive with torque limiting coupling and speed monitor W

[1]	Trip cam	[4]	Friction ring pads	[7]	Friction hub
[2]	Encoder	[5]	Cup spring	[8]	Speed monitor
[3]	Carrier disk	[6]	Slotted round nut		

Drives with a torque limiting coupling consist of a standard gear unit and motor/variable speed gearmotor with an adapter installed between them. The torque limiting coupling is installed in this adapter. In gearmotors with a multi-stage gear unit, the torque limiting coupling may be located between the first and second gear units.

The friction hub [7] at the motor end has cup springs [5] and a slotted round nut [6]. It drives the coupling plate and connecting pin at the output end by means of the friction ring pads [4] of the carrier disk [3]. The slip torque is individually set in the factory according to the specific drive selection.

The speed of the coupling plate at the output end is picked up by an encoder [2] and passed on to a monitoring unit [8]. Speed monitors and slip monitors are used as monitoring units. These can be mounted in conjunction with contactors, fuse units, etc. on a standard 35 mm rail (to DIN EN 50022) in the switch cabinet or they can be attached using two holes.

Speed monitor WEX

The speed monitor [8] is used with constant-speed gearmotors and is connected to the encoder [2] in the adapter.

Mounting

Mounting the encoder

1. Remove the fan guard from the driving motor
2. Slowly turn the motor or adapter shaft extension until a trip cam (= head of the cheese head screw) becomes visible in the threaded hole
3. Screw in the encoder until contact is made with the trip cam
4. Turn the encoder [1] back by two turns (corresponds to a clearance of 2 mm)

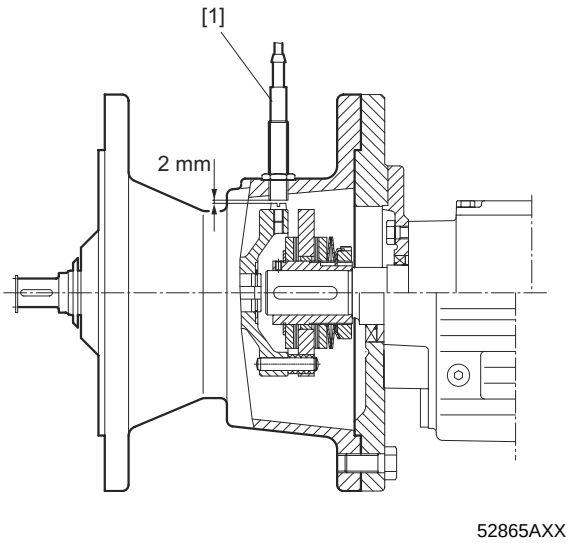


Figure 14: Encoder

5. Use a lock nut to secure the encoder on the outside of the adapter
6. Checking: Slowly turn the motor or adapter shaft extension

   Correct mounting: trip cams do not touch the encoder
7. Install the fan guard

The speed monitor must be located outside the potentially explosive atmosphere.

Connecting monitoring devices

Do not route the feeder lines in multicore cables to avoid interference from parasitic voltages. Maximum line lengths 500 m with core cross section 1.5 mm 2. Use shielded cables if there is a risk of interference from power current or control cables and if the lines are longer than 10 m.

Comply with the relevant standards. This applies in particular in the potentially explosive atmosphere!

1. **For version with speed monitor WEX**

   Connect the encoder of the adapter to the speed monitor

   - using a 2-core cable
   - The encoder generates 1 pulse per revolution

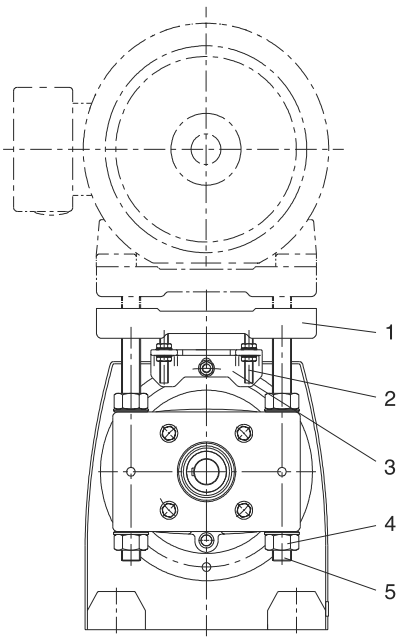
2. Connect the speed monitor according to the wiring diagram supplied with the speed monitor.

4.14 Input shaft assembly AD

Please refer to Sec. "Installing input and output shafts" concerning the mounting of input elements.

Assembly with motor mounting platform AD../P

Mounting the motor and adjusting the motor mounting platform.



1 Motor mounting platform
2 Stud bolt (only AD6/P / AD7/P)
3 Support (only AD6/P / AD7/P)
4 Nut
5 Threaded column

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1. Set the motor mounting platform to the required mounting position by evenly tightening the adjusting nuts. It may be necessary to remove the lifting eyebolt from helical gear units in order to achieve the lowest adjustment position. Touch up any damage to the paint.
2. Align the motor on the motor mounting platform (shaft ends must be in alignment) and secure it.
3. Mount the input elements on the input shaft end and the motor shaft. Line them up with one another. Correct the motor position again if necessary.
4. Put on traction elements (V-belt, chain, etc.) and apply a preload by evenly adjusting the motor mounting platform. Do not stress the motor mounting platform and the columns against one another when doing this.
5. Tighten the threaded columns using the nuts which are not used for adjustment.

Only AD6/P and AD7/P:

Unscrew the nuts on the stud bolts before adjustment to allow the stud bolts to move axially in the support without restriction. Do not tighten the nuts until the final adjustment position has been achieved. Do not adjust the motor mounting platform using the support.

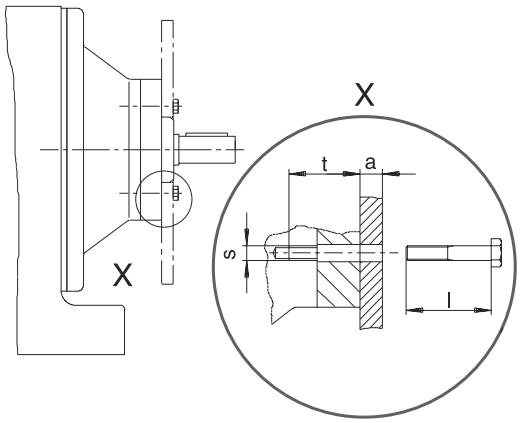
Use belts with a sufficient electric shunt resistance (< 109 Ω) only.

- **Before a protective hood can be installed, a risk analysis must demonstrate that no sources of ignition (e.g. impact sparks from grinding) can occur. The risk analysis must be carried out by the manufacturer.**

Type with centering shoulder AD../ZR

Mounting applications on the input shaft assembly with centering shoulder.

1. Provide retaining bolts of a suitable length for the application. The length l of the new bolts is calculated as follows:



l = t + a
t = Screw-in depth (see table)
a = Thickness of the application
s = Retaining thread (see table)

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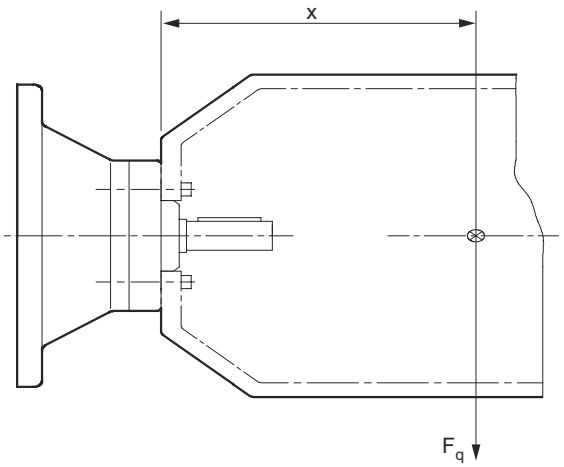
Round down the calculated bolt length to the next smaller standard length.

2. Remove the retaining bolts from the centering shoulder.
3. Clean the contact surface and the centering shoulder.
4. Clean the threads of the new bolts and apply a bolt locking compound (e.g. Loctite 243) to the first few threads.
5. Position the application against the centering shoulder and tighten the retaining bolts to the specified tightening torque T_A (see table).

Type	Screw-in depth t	Retaining thread s	Tightening torque T_A for connecting bolts of strength class 8.8 [Nm]
AD2/ZR	25.5	M8	25
AD3/ZR	31.5	M10	48
AD4/ZR	36	M12	86
AD5/ZR	44	M12	86
AD6/ZR	48.5	M16	210
AD7/ZR	49	M20	410
AD8/ZR	42	M12	86

Permitted loads

Do not exceed the load data specified in the following table.



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Type	x[1)] [mm]	F_q[1)] [N]
AD2/ZR	193	330
AD3/ZR	274	1400
AD4/ZR[2)]	361	1120
AD4/ZR		3300
AD5/ZR	487	3200
AD6/ZR	567	3900
AD7/ZR	663	10000
AD8/ZR	516	4300

1) Maximum load values for connecting bolts with strength class 8.8. The maximum permitted weight of the mount-on motor F_{qmax} must be reduced in direct proportion to the increase in the distance of the center of gravity x. No increase in F_{qmax} is permitted when the distance of the center of gravity is reduced.

2) Diameter of the adapter output flange: 160 mm

Cover with backstop AD../RS

Check the direction of rotation of the drive before installation and startup. Please inform the SEW-EURODRIVE customer service if the direction of rotation is incorrect.

The backstop is maintenance-free in operation, and does not require any further maintenance work.

Backstops have minimum lift-off speeds depending on their size (→ following table). If the backstop speed is less than the minimum lift-off speed, it will operate with abrasion and the resulting friction will lead to high temperatures.

Type	Maximum locking torque of backstop [Nm]	Minimum lift-off speed [rpm]
AD2/RS	90	640
AD3/RS	340	600
AD4/RS	700	550
AD5/RS	1200	630
AD6/RS	1450	430
AD7/RS	1450	430
AD8/RS	2860	430

The speed must not drop below the minimum lift-off speed during rated operation. The speed is only allowed to be less than the minimum lift-off speed during startup or braking.

5 Startup

The oil level specified for the particular mounting position must be checked prior to startup. The oil checking and drain screws as well as the breather plugs and valves must be freely accessible.

5.1 Checking the oil level in gear units with an oil level screw

Multi-stage gear units in series

- R../R.. in mounting positions M1 and M2
- F../R.. in mounting position M3

have an elevated oil level that is required for sufficient lubrication. For this reason, do not use the oil level screws that are fitted in these units. **You must contact SEW-EURODRIVE in this case!**

1. **Isolate the gearmotor from the supply, safeguarding it against unintentional power-up!**
2. Remove the oil level screw. Check the fill level using the dipstick (1) supplied in the operating instructions at the oil level hole (3). During the measurement, make sure that the **guide clip (2)** of the dipstick (1) **is always pointing vertically upwards** (→ following figure).

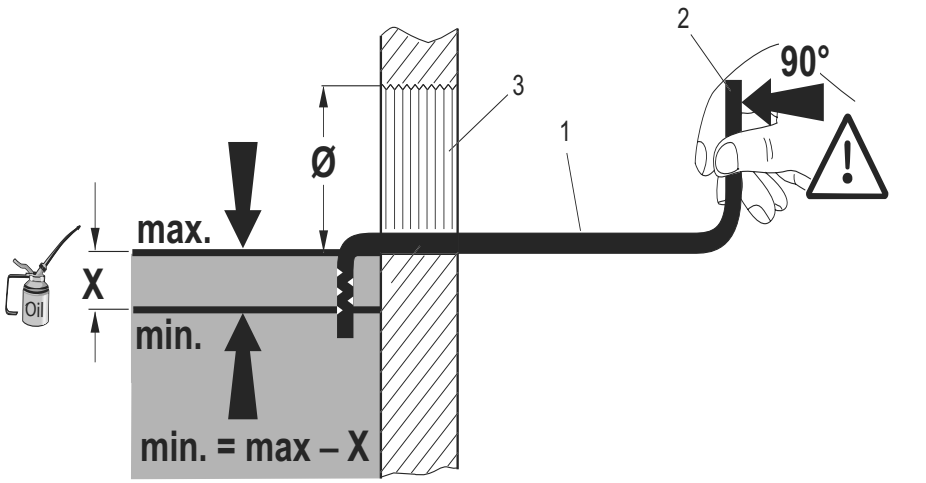


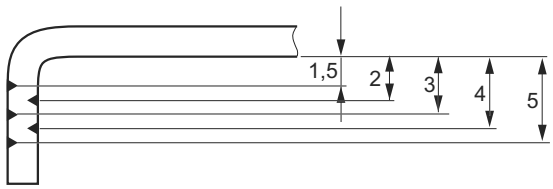
Figure 15: Checking the oil level

Maximum fill level (max.): Bottom edge of the oil level hole (3)

Minimum fill level (min.): Maximum fill level (max.) less the value "x" (→ following table) depending on the diameter (∅) of the oil level hole (3).

∅ Oil level hole	Minimum fill level = x [mm] = Mark on dipstick
M10 x 1	1.5
M12 x 1.5	2
M22 x 1.5	3
M33 x 2	4
M42 x 2	5

The correct minimum fill level given in the table (value "x") corresponds to the marks on the dipstick (→ following figure).



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3. Correct the fill level if necessary, screw the oil level screw back in again.

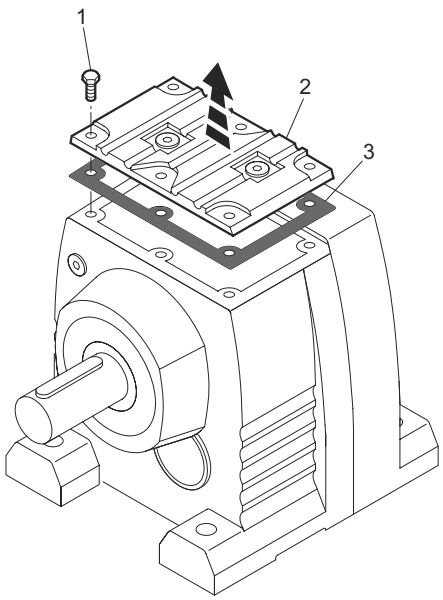
5.2 Checking the oil level in gear units without an oil level screw

The following gear unit series do not have an oil level screw:

- R07, R17, R27
- R47 and R57 in mounting position M5
- F27
- W20, W30

The oil level is checked in the aforementioned gear unit series via the cover plate opening.

1. **Isolate the gearmotor from the supply, safeguarding it against unintentional power-up!**
2. Set up the gear unit in mounting position M1 (→ following figure), i.e. cover plate always upwards. Exception: Series F27 gear units should be set up in mounting position M3.
3. Loosen the screws (1) on the cover plate (2). Remove the cover plate (2) with the associated seal (3) (→ following figure).



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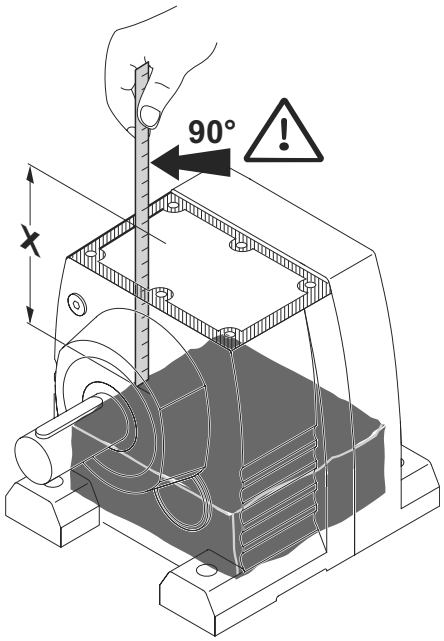
4. Measure the vertical distance "x" between the oil surface and the sealing surface of the gearcase (→ following figure).



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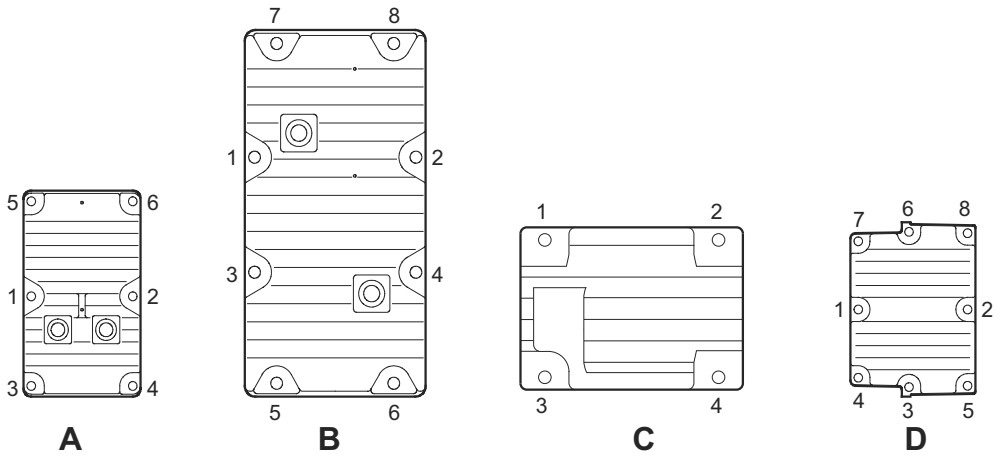
5. Compare the measured distance value "x" with the maximum distance between the oil surface and the sealing surface of the gearcase (depends on the mounting position) given in the following table. Correct the fill level (→ nameplate) if necessary.

Gear unit type		Maximum distance x [mm] between oil surface and sealing surface of the gearcase for mounting position					
		M1	M2	M3	M4	M5	M6
R07	2-stage	52 ± 1	27 ± 1	27 ± 1	27 ± 1	27 ± 1	27 ± 1
	3-stage	49 ± 1	21 ± 1	21 ± 1	21 ± 1	21 ± 1	21 ± 1
R17	2-stage	63 ± 1	18 ± 1	46 ± 1	18 ± 1	46 ± 1	46 ± 1
	3-stage	58 ± 1	11 ± 2	40 ± 2	11 ± 2	40 ± 2	40 ± 2
R27	2-stage	74 ± 1	22 ± 1	45 ± 1	22 ± 1	45 ± 1	45 ± 1
	3-stage	76 ± 1	19 ± 1	42 ± 1	19 ± 1	42 ± 1	42 ± 1
R47	2-stage	–	–	–	–	39 ± 1	–
	3-stage	–	–	–	–	32 ± 1	–
R57	2-stage	–	–	–	–	32 ± 1	–
	3-stage	–	–	–	–	28 ± 1	–
F27	2-stage	78 ± 1	31 ± 1	72 ± 1	56 ± 1	78 ± 1	78 ± 1
	3-stage	71 ± 1	24 ± 1	70 ± 1	45 ± 1	71 ± 1	71 ± 1
		Not dependent on mounting position					
W20		21 ± 3					
W30		20 ± 3					

6. **Close the gear unit after checking the oil level:**
   - Put back the seal of the cover plate. Make sure that the sealing surfaces are clean and dry.
   - Install the cover plate. Tighten the cover screw connection from the inside outwards in the specified sequence for each particular gear unit type, using the numbering shown in the following figure, to the nominal tightening torque specified in the following table. Repeat the tightening procedure until all the screws are firmly tightened. Only use electric drivers or torque wrenches (no impact drivers) to avoid damaging the cover plate.



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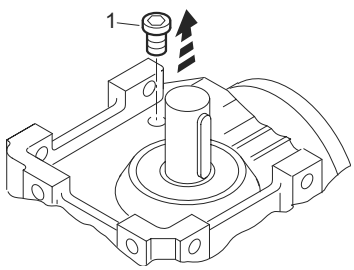
Gear unit type	Fig.	Retaining thread	Nominal tightening torque T_N [Nm]	Minimum tightening torque T_{min} [Nm]
R/RF 07/17/27	D	M6	11	7
R/RF47/57	A			
F27	B			
W20	C			
W30	A			

Checking the oil level in gear units without an oil level screw or cover plate

The S37 gear unit series does not have an oil level screw or a cover plate. The oil level is checked using a dipstick at the vent hole.

1. **Isolate the gearmotor from the supply, safeguarding it against unintentional power-up!**
2. Set up the gear unit in mounting position M5 or M6, i.e. with the vent screw always upwards. Unscrew and remove the vent screw (1) (→ following figure).



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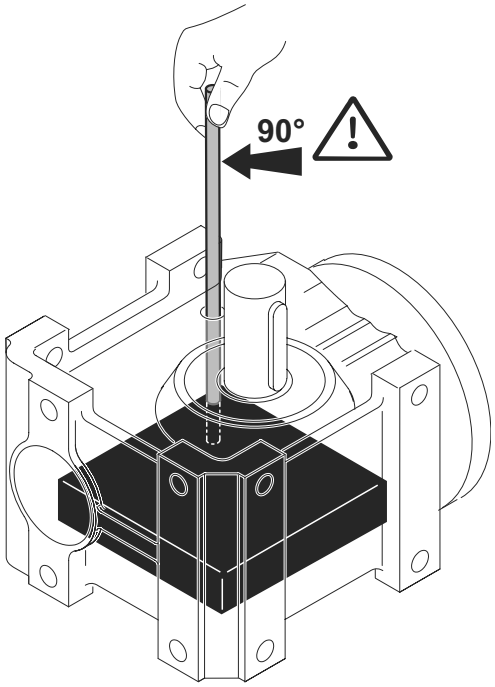
3. Guide the dipstick vertically through the vent hole as far as the base of the gearcase. Pull the dipstick vertically back out of the vent hole (→ following figure).



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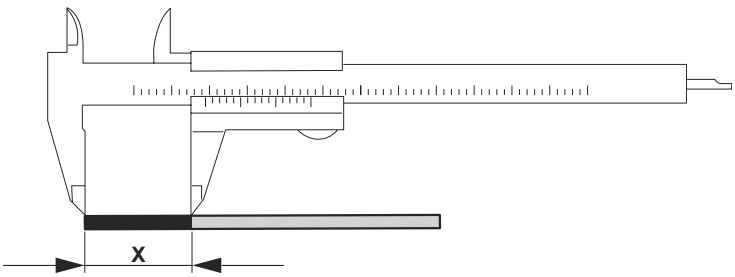
4. Use a caliper gauge to measure the length "x" of the dipstick that is covered with lubricant (→ following figure).



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5. Compare the measured value "x" with the minimum value depending on the mounting position and specified in the following table. Correct the fill level (→ nameplate) if necessary.

Gear unit type	Oil level = Wet length x [mm] on dipstick Mounting position					
	M1	M2	M3	M4	M5	M6
S37	10 ± 1	24 ± 1	34 ± 1	37 ± 1	24 ± 1	24 ± 1

6. Install the vent screw and tighten firmly.

5.3 Measuring the surface and oil temperature

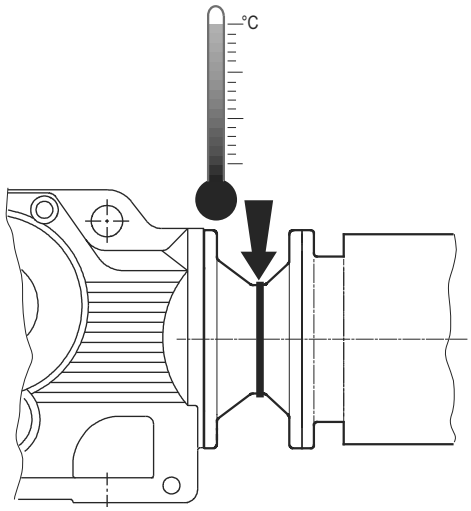
The information about the maximum surface temperature on the nameplate is based on measurements taken under normal ambient and setup conditions. Even slight changes in these conditions (e.g. cramped installation conditions) can have a significant effect on the temperature profile.

Measuring the surface temperature

During startup of the gear unit, it is essential to measure the surface temperature under maximum load conditions. The measurement can be made using commercially available thermometers. Measure the surface temperature at the transition from the gear unit to the motor where the terminal box position prevents ventilation by the motor fan. The maximum surface temperature is attained after approx. 3 hours, and **must not be more than 70 K over ambient temperature**.

Stop the drive immediately if the differential value is greater than this. You must contact SEW-EURODRIVE in this case.

In gear units with an adapter AM, AQ, AR or input shaft assembly AD, the surface temperature is measured at the joint between the input end gear unit flange and the customer's motor flange (→ following figure).



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Measuring the oil temperature

The oil temperatures must be measured in order to define the lubricant change intervals described in Sec. "Inspection and maintenance". To do this, measure the temperature on the underside of the gear unit. On gear units with an oil drain screw, measure the temperature at the oil drain screw. Add 10 K to the measured value. Use this temperature value to determine the lubricant change interval.

5.4 Startup of helical-worm and SPIROPLAN® W gear units

Please note: The direction of rotation of the output shaft in series S..7 helical-worm gear units has been changed from CW to CCW; this is different from the S..2 series. Change direction of rotation: Swap over two motor feeder cables.

Running-in period

SPIROPLAN® and helical-worm gear units require a running-in period of at least 24 hours before reaching their maximum efficiency. A separate running-in period applies for each direction of rotation if the gear unit is operated in both directions of rotation. The table shows the average power reduction during the running-in period.

No. of starts	Worm		Spiroplan®	
	Power reduction	i range	Power reduction	i range
1 start	ca. 12%	approx. 50 – 280	ca. 15%	approx. 40 – 75
2 start	ca. 6%	approx. 20 – 75	ca. 10%	approx. 20 – 30
3 start	ca. 3%	approx. 20 – 90	ca. 8%	ca. 15
4 start	-	-	ca. 8%	ca. 10
5 start	ca. 3%	approx. 6 – 25	ca. 5%	ca. 8
6 start	ca. 2%	approx. 7 – 25	-	-

5.5 Startup of helical, parallel shaft helical and helical-bevel gear units

No special startup instructions are required for helical, parallel shaft helical and helical-bevel gear units providing the gear units have been installed in accordance with Sec. "Mechanical installation".

5.6 Starting up gear units / gearmotors in potentially explosive atmospheres

Single gear unit

In the case of gear units with adapters or an input shaft assembly, measures must be taken to ensure that the entries stated on the nameplate of the gear unit are not exceeded. The possibility of overloading the gear unit must be precluded.

Mains-operated motors

Check the entries on the nameplates of the gear unit and the motor correspond to the actual conditions on-site.

Inverter-operated gearmotors

- Check that the gearmotor is also approved for operation with an inverter (nameplate).
- The parameter settings of the inverter must prevent an overload of the gear unit. Refer to the nameplate for the corresponding permitted gear unit performance data.

5.7 Speed monitoring

Standard design of WEX option

The standard design of the explosion-proof torque limiting coupling adapter AR features an M12x1 tapped hole for mounting a voltage encoder in the motor flange of the adapter. The speed monitor and voltage encoder are supplied by SEW-EURODRIVE.

Manufacturer's data

Data of the speed monitor in WEX design:

Manufacturer:	Pepperl + Fuchs, Mannheim
Type:	KFU8-UFC-Ex1.D
Auxiliary power supply:	DC 20 – 90 V / AC 48 – 253 V
ATEX certification number	TÜV 99 ATEX 1471

Data of the voltage encoder in WEXA/WEX/IGEX design

Manufacturer:	Pepperl + Fuchs, Mannheim
Type:	NCB12-12GM35-N0 to DIN 19234 (NAMUR)
Housing:	M12x1
ATEX certification number	TÜV 99 ATEX 1471

5.8 Installing and adjusting the WEX speed monitor

1. Read the operating instructions of the speed monitor manufacturer before you begin with the installation!
2. Perform the basic adjustment of the speed monitor in accordance with the operating instructions of the speed monitor manufacturer.

The setting must cause the drive to switch off if the speed is 5 % less than the nominal speed of the motor being used. Refer to the motor nameplate for the nominal speed of the drive motor.

The sensor installed in the adapter generates 1 pulse per revolution of the adapter shaft. If the speed drops below the switching speed of the adapter, i.e. the installed clutch slips, the drive motor must be immediately disconnected from the supply voltage.

The cause of the problem must be eliminated and the operation of the adapter stopped for at least 15 minutes before restarting the adapter. If incorrect operation by the operating personnel cannot be ruled out, this interval should be triggered by an automatic restart lockout.

All installation and adjustment notes given below refer to the speed monitor or voltage encoder in WEX design.

If the supplied WEX design of speed monitor differs from this, it must be installed and started up according to the manufacturers documentation.

The speed monitor must be located outside the potentially explosive atmosphere.

Installing and adjusting the WEXA/WEX speed monitor

Relay 2 can be used for creating a warning signal or for machine control (terminal assignment 16-18).

The wiring diagram below shows one possible wiring method for the speed monitor.

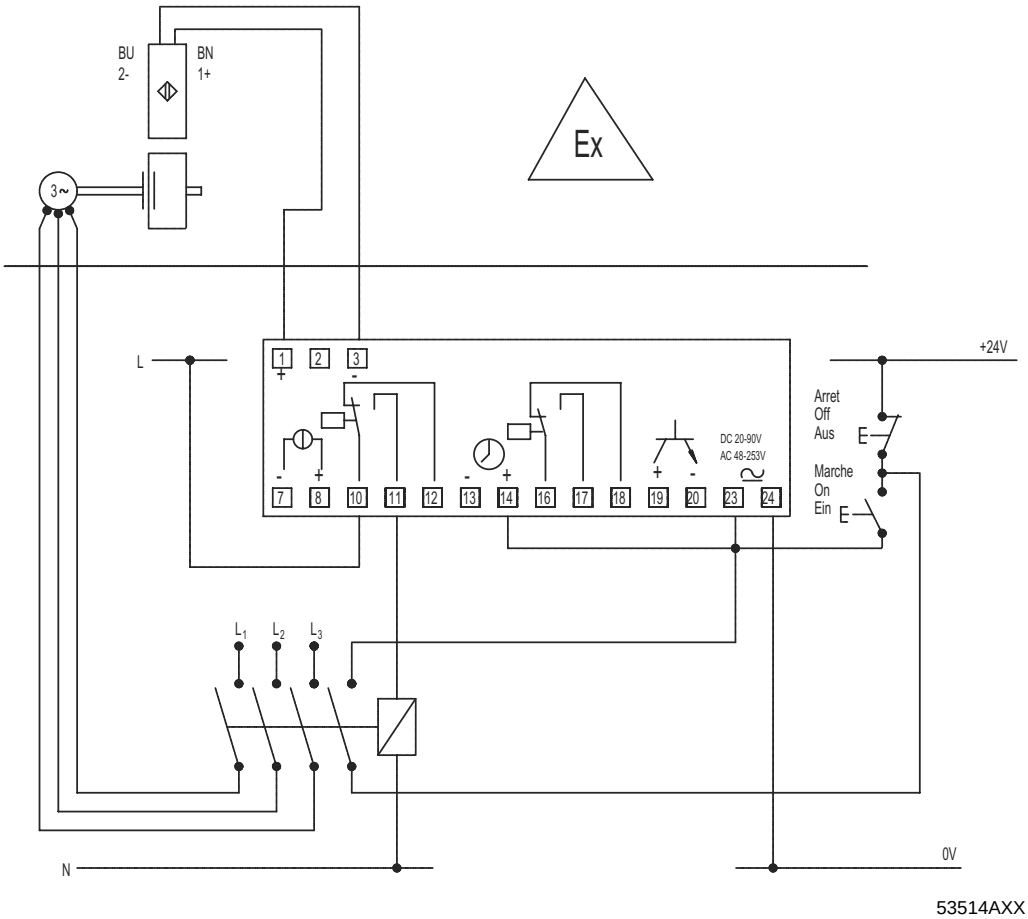

Figure 16: Connecting the WEXA/WEX speed monitor

[1]	Sensor +	[14]	Startup bypass
[3]	Sensor -	[23]	24 V_{DC} voltage supply, +
[10]	Relay 1 (shared connection)	[24]	24 V_{DC} voltage supply, -
[11]	Relay 1 (normally open contact)	[19]	Auxiliary output for customer application, +
[12]	Relay 1 (normally closed contact)	[20]	Auxiliary output for customer application, -

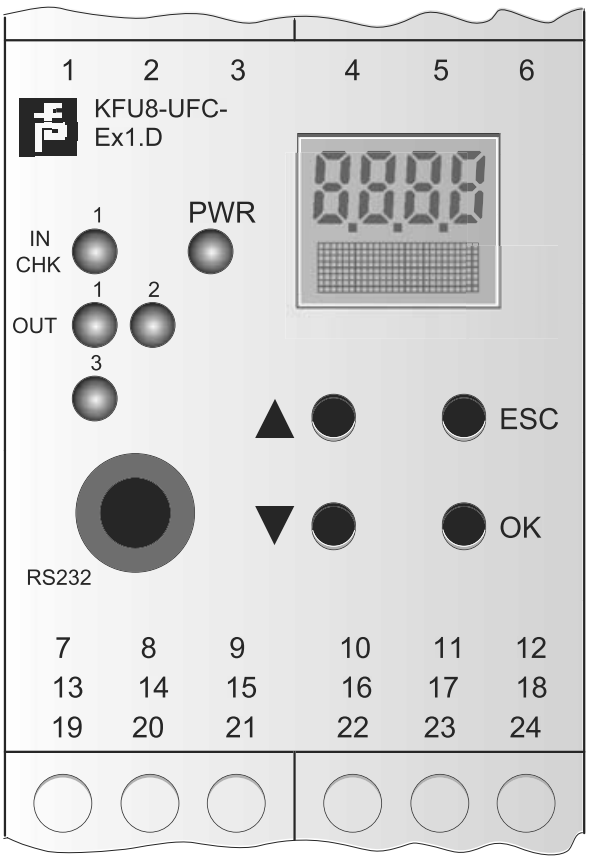

Figure 17: Speed monitor WEX design

Front side of the speed monitor:

LED in CHK 1 (yellow/red)	for displaying the input pulses (flashes yellow at intervals), an input malfunction (flashes red) and a unit malfunction (continuous red)
LED PWR (green)	for indicating the supply voltage
LED OUT 1 (yellow)	for indicating relay 1 active
LED OUT 2 (yellow)	for indicating relay 2 active
LED OUT 3 (yellow)	for indicating transistor active
RS232	serial RS232 port for connecting a PC for parameter setting and diagnosis of the UFC with PACTware
Display	for indicating measured values and faults in parameter assignment mode

The start bypass time must not exceed 3 seconds. This setting must be carefully performed and verified by a final measuring step!

Installing and adjusting other speed monitors

If other speed monitors are used, they must feature an intrinsically safe sensor input (identification color: blue) for evaluation of sensors according to DIN 19234 (NAMUR) and be approved for use of this sensor in potentially explosive atmospheres.

The voltage encoder (sensor) generally features a blue connection lead and must conform to DIN 19234 (NAMUR). The corresponding inspection number may be attached to the voltage encoder or the connection lead.

If the switching speed of the torque limiting coupling adapter is less than that in the table, the drive motor must be immediately disconnected from its supply voltage.

Before re-startup of the torque limiting coupling adapter, the error must be corrected and the variable speed gear unit must be stopped for at least 15 minutes. If incorrect operation by the operating personnel cannot be ruled out, this interval should be triggered by an automatic restart lockout.

If vibrations or increased operating noises are noticeable after restarting the variable speed gear unit, the wide V-belt was damaged during the blocking and must be replaced (see Sec. "Inspection / maintenance" Replacing wide V-belt).

5.9 Installing the voltage encoder

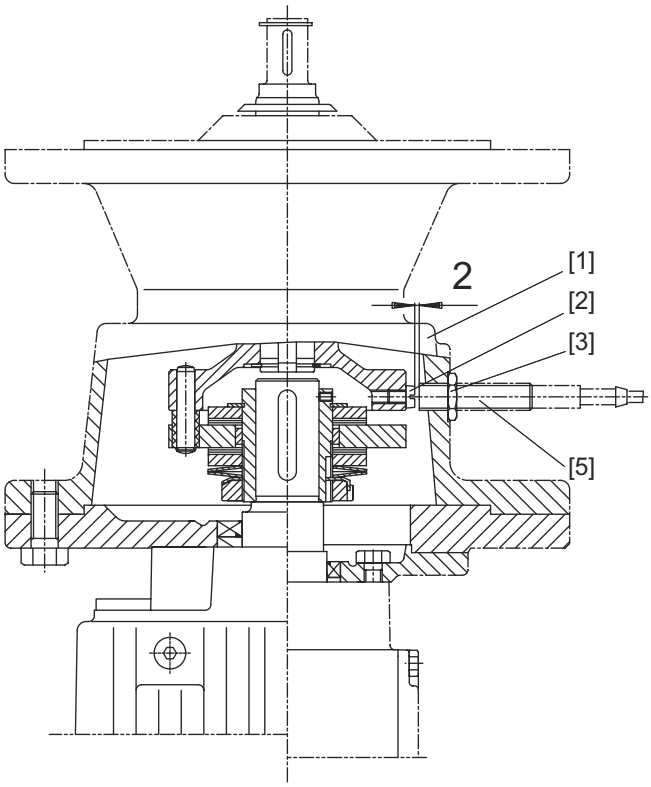

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Figure 18: Installing voltage encoder and setting the operating distance x

[1]	Adapter flange	[3]	Lock nut
[2]	Screw head	[5]	Voltage encoder

1. Rotate the output shaft of the torque limiting coupling adapter until the slotted screw head can be seen through the tapped hole in the bearing cover.
2. Voltage encoder:
   - Carefully screw it into the adapter flange [1] of the variable speed gear unit until the voltage encoder [5] rests on the screw head [2].
   - Screw back by 2 turns and secure with lock nut [3]

This sets the operating distance to 2 mm. The voltage encoder supplies one pulse per revolution during operation at this operating distance.

Changing operating distance x

If no circuit state change occurs at the voltage encoder (LED display) when the shaft of the torque limiting coupling adapter is rotating and the operating distance x = 1 mm, the operating distance can be changed as follows:

1. With **constantly lit LED** [4] of the voltage encoder, turn the voltage encoder a half turn **counterclockwise** at a time and check its function.
2. If the **LED is not lit** [4], turn the voltage encoder **clockwise** by 90 degrees but no more than one time.

Do not turn the voltage encoder more than half a turn into the tapped hole because it would be destroyed by a collision with the slotted screw heads!

3. If a circuit change still does not occur, check the voltage supply of the voltage encoder using the evaluation electronics (with WEXA/WEX design).

6 Inspection and Maintenance

6.1 Inspection and maintenance intervals

Frequency	What to do?
• Every 3000 machine hours, at least every 6 months	• Check the oil and the oil level • Look and check the seals for leaks • Gear units with torque arm: Check the rubber buffer and fit a new one if necessary
• Depending on the operating conditions (see illustration below), at the latest every 5 years • Depending on the oil temperature	• Change synthetic oil
	• Change anti-friction bearing grease (recommended) • Change oil seal (do not install the new one on the same wear trace)
• Gear units R07, R17, R27, F27 and Spiroplan® have lubrication for life and are therefore maintenance-free	
• Varying (depending on external factors)	• Touch up or renew the surface/anticorrosion coating

6.2 Lubricant change intervals

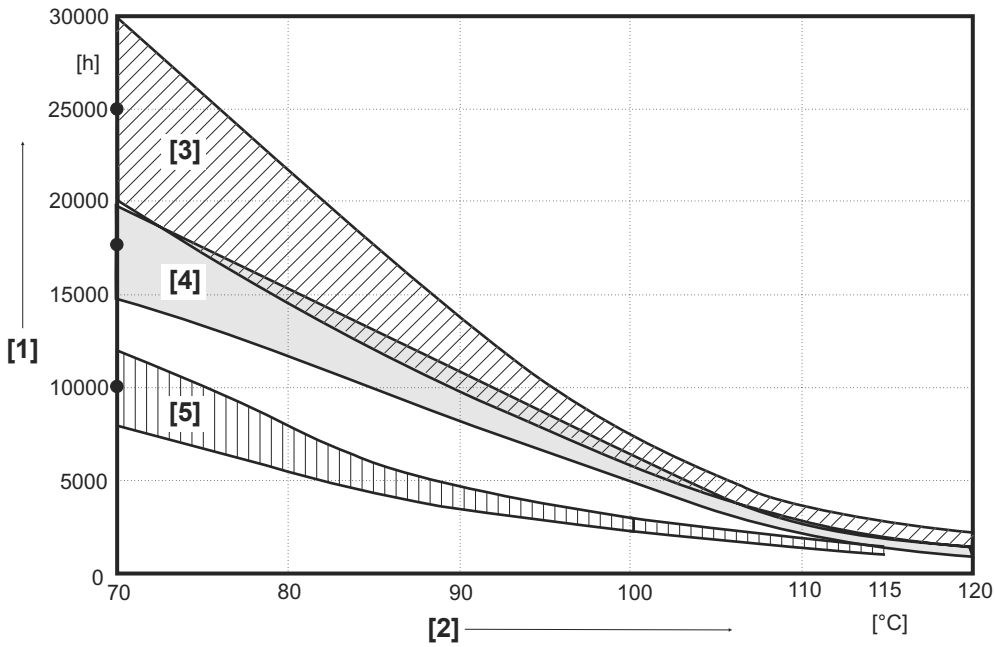


Figure 19: Oil change intervals for standard gear units under normal ambient conditions

[1] Operating hours
[2] Sustained oil bath temperature
- Average value per oil type at 70 °C

[3] CLP PG
[4] CLP HC / HCE
[5] CLP / HLP / E

6.3 Inspection/maintenance work on adapter AM / AQA

Frequency	What to do?
• Every 3000 machine hours, at least every 6 months	• Check torsional play • Look and check the flexible annular gear • Look and check the adapter for leaks
• After 25,000 – 30,000 machine hours	• Renew the anti-friction bearing grease • Change oil seal (do not install the new one on the same wear trace) • Change flexible annular gear

6.4 Inspection/maintenance work on adapter AR

Unit / unit part	Frequency	What to do?	→ Sec.
Adapter with torque limiting coupling	The periods of wear are affected by many factors and may be short. At least every **3000** operating hours	Inspect the friction ring pads and cup springs, change if necessary, adjust the slip torque if the value is too low	See "Inspection / maintenance of the drive with AR torque limiting coupling"

Change the friction ring pads if they have reached 50 % of their total original thickness (see following table).

Brake disk in new condition:

Type	Friction ring pad thickness [mm]
AR71 / AR80 / AR85 / AR90 / AR95	2
AR100 / AR105 / AR112	3
AR132 / AR135 / AR145 / AR160 / AR165 / AR180 / AR185 / AR195	4

Dimensions of setting tool

Type	d [mm]	l [mm]	u [mm]	t_{max} [mm]
AR71	14	30	5	16.3
AR80 / AR85	19	40	6	21.8
AR90 / AR95	24	50	8	27.3
AR100 / AR105 / AR112	28	60	8	31.3
AR132 / AR135 / AR145	38	80	10	41.3
AR160 / AR165	42	110	12	45.3
AR180 / AR185 / AR195	48		14	51.8

Required tools / aids

- Standard tool
- Hook spanner
- Hydraulic press
- Puller/extractor (threaded spindle with diameter like gear unit input shaft)
- Torque wrench

Inspecting / changing the friction ring pads, adjusting the slip torque

It is only possible to check and adjust the slip torque accurately by using a torque wrench with an appropriate connection piece. For the setting of values, see the table on page 71.

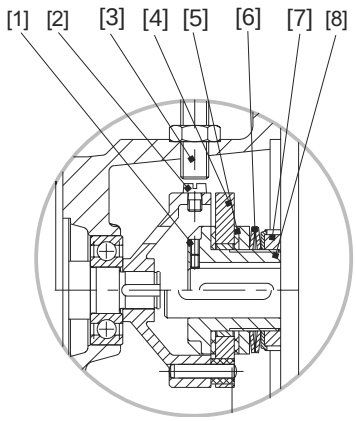


Figure 20: Inspecting / changing the friction ring pads

[1] Locking screw
[2] Cylinder head screw
[3] Proximity switch
[4] Friction disk
[5] Friction ring pad
[6] Cup spring
[7] Slotted round nut
[8] Friction hub

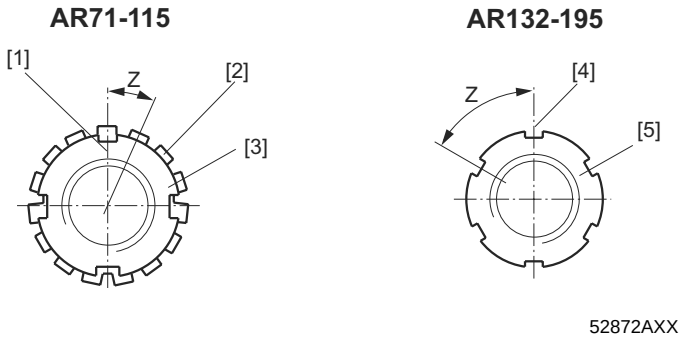


Figure 21: Rough torque setting

[1] Marking
[2] Multi-tang washer (tangs)
[3] Slotted round nut
[4] Markings (carrier disk)
[5] Slotted round nut

1. **De-energize the drive and secure it to prevent it from being switched on inadvertently**
2. Disconnect the motor/variable speed gearmotor from the adapter
3. Loosen the safety screw [1], pull the friction hub [8] off the shaft extension (see Figure 20)
4. Clamp the friction hub [8] in a vise
5. **With AR 71–115:** Unscrew the multi-tang washer [2] (see Figure 21)

   With AR 132–195: Unscrew the clamping screw on the slotted round nut [7] (see Figure 20)
6. Loosen the slotted round nut somewhat until you can easily adjust the torque limiting coupling by hand
7. **With AR 71–115:** Mark the position of the slotted round nut [3] (see Figure 21)

   With AR 132–195: Mark the carrier disk [4] (see Figure 21)

8. Loosen and remove the slotted round nut, remove the cup springs [6] (see Figure 20)

   Note: Note the sequence of the cup springs!

9. Inspect the friction ring pads [5]: change them if they are worn

   Note: Do not allow any lubricants to get onto the friction surface – this will irreparably damage the surface!
10. Inspect the cup springs [6]: change them if they are burned out
11. Put the cup springs [6] back in (in the same sequence as before)
12. Screw on the slotted round nut up to the mark
13. Measuring/adjusting

    with a torque wrench

    - Connect the torque wrench to the hole in the hub
    - Measure the torque (in both directions), if necessary readjust using the slotted round nut

    Rough setting without torque wrench

    - Use the hook spanner to set the torque limiting coupling (see Figure 21)
    - Slip torque according to value "Z" (see the following table), calculated from the mark

    With AR 71–115: = Number of tangs on the multi-tang washer

    With AR 132–195: = Number of slots in the slotted round nut
14. Secure the slotted round nut using the multi-tang washer or clamping screw
15. Assemble the drive in reverse order

Slip torques AR

Adapter type	Cup springs			Setting range	No. of tangs or slots "Z"																				
	Quantity	Thickness mm	Sequence Fig.[1)]	Nm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
					Slip torque M_R in Nm																				
AR71	4	0.6	1	1.0-2.0						1.0	1.4	1.6	1.8	2.0											
			2	2.1-4.0						2.1	-	2.4	2.6	3.2	3.4	3.8	4								
	3		3	4.1-6.0			4.1	5.0	5.8	6.0															
AR80	4	0.6	1	1.0-2.0						1.0	1.4	1.6	2.8	2.0											
			2	2.1-4.0						2.1	-	2.4	2.6	3.2	3.4	3.8	4.0								
	3		3	4.1-6.0			4.1	5.0	5.8	6.0															
	4	0.9	2	6.1-16				6.0	8.0	9.0	10	11	12	13	14	15	16								
AR85 AR90 AR95	4	0.6	2	2.0-4.0				2.0	2.4	3.0	3.6	3.8	4.0												
	3		3	4.1-6.0			4.1	5.0	5.8	6.0															
	4	0.9	2	6.1-16				6.0	8.0	9.0	10	11	12	13	14	15	16								
	2	1.1	3	17-24			16	20	24																
AR100	6	0.7	2	5.0-13							5.0	6.0	8.0	9.0	10	11	12	13							
AR105 AR112 AR115	2	1.45	2	14-35						14	16	17	18	20	22	23	24	26	27	28	-	30	31	32	35
			3	36-80						36	41	45	48	54	58	60									
AR132S/M AR132ML AR135 AR145	4	1.5	1	15-32				15	18	22	24	26	-	28	30	32									
			2	33-65			33	40	50	58	67														
			3	66-130		68	100	120	135																
AR160	4	1.5	1	30-45										32	36	38	40	41	42	40	44	45			
			2	46-85			46	48	60	65	70	75	80	85											
	2	2.7	2	86-200					86	90	110	125	135	150	160	180	190	200							
AR165 AR180 AR185 AR195	4	1.5	1	30-45										32	36	38	40	41	42	44	45				
			2	46-85			40	48	60	65	70	75	80	85											
	2	2.7	2	86-200					86	90	110	125	135	150	160	170	180	190	200						
			3	201-300			200	280	300																

1) For sequence of cup springs, refer to the legend below

Legend

Fig. 1	Double alternating sequence	()()
Fig. 2	Alternating sequence	()
Fig. 3	Aligned sequence	))

Changing the encoder on the adapter

The switching output of the encoder does not have any contacts, so its service life is not limited by the starting frequency. Proceed as follows if it has to be changed nevertheless:

1. **De-energize the drive and secure it to prevent it from being switched on inadvertently**
2. Remove the fan guard from the driving motor
3. Remove the encoder connection
4. Unscrew the lock nut on the encoder and remove the old encoder
5. Install the encoder (see Sec. Installation "Installing the encoder")
6. Connect the encoder to the speed/slip monitor
7. Install the fan guard

8. **Only genuine spare parts are allowed to be used in accordance with the supplied spare parts lists.**

6.5 Inspection/maintenance work on adapter AD

Frequency	What to do?
• Every 3000 machine hours, at least every 6 months	• Check running noise, indicates possible bearing damage • Look and check the adapter for leaks
• After 25,000 – 30,000 machine hours	• Renew the anti-friction bearing grease
	• Change the oil seal

7 Malfunctions

Customer service

Please have the following information to hand if you require the assistance of our customer service:
- Data from the nameplate (complete)
- Nature and extent of the fault
- Time and peripheral circumstances of the fault
- Presumed cause

7.1 Gear unit malfunctions

Problem	Possible cause	Remedy
Unusual, regular running noise	A Meshing/grinding noise: Bearing damage B Knocking noise: Irregularity in the gearing	A Check the oil (see Sec. "Inspection and maintenance"), change bearings B Contact customer service
Unusual, irregular running noise	Foreign bodies in the oil	• Check the oil (see Sec. "Inspection and maintenance") • Stop the drive, contact customer service
Oil leaking[1)] • from the gear cover plate • from the motor flange • from the motor oil seal • from the gear unit flange • from the output end oil seal	A Rubber seal on the gear cover plate leaking B Seal defective C Gear unit not vented	A Tighten the bolts on the gear cover plate and observe the gear unit. Oil still leaking: Contact customer service B Contact customer service C Vent the gear unit (see Sec. "Mounting positions")
Oil emerging from breather valve	A Too much oil B Drive operated in incorrect mounting position C Frequent cold starts (oil foams) and/or high oil level	A Correct the oil level (see Sec. "Inspection and maintenance") B Mount the breather valve correctly (see Sec. "Mounting positions") and correct the oil level (see Sec. "Lubricants")
Output shaft does not turn although the motor is running or the input shaft is rotated	Connection between shaft and hub in gear unit interrupted	Send in the gear unit/gearmotor for repair

1) Brief leakage of oil / grease – Leakage from the oil seal may occur during the running-in period (first 24 hours of operation).

7.2 Malfunctions on adapter AM / AQA / AL

Problem	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage	Consult with SEW-EURODRIVE customer service
Oil leaking	Seal defective	Consult with SEW-EURODRIVE customer service
Output shaft does not turn although the motor is running or the input shaft is rotated	Connection between shaft and hub in gear unit or adapter interrupted	Return the gear unit to SEW-EURODRIVE for repair
Change in running noises and/or if vibration occurs	A Wear on the annular gear, intermittent torque transmission by contact with metal B Axial securing bolts on hub loose	A Change annular gear B Tighten bolts
Premature wear on annular gear	A Contact with aggressive fluids / oils; effect of ozone, excessive ambient temperatures, etc., resulting in a physical modification of the annular gear B Ambient contact temperatures impermissibly high for the annular gear; max. permitted range: -20 °C to +80 °C C Overload	Consult with SEW-EURODRIVE customer service

7.3 Malfunctions on input shaft assembly AD

Problem	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage	Consult with SEW-EURODRIVE customer service
Oil leaking	Seal defective	Consult with SEW-EURODRIVE customer service
Output shaft does not turn although input shaft is turned	Connection between shaft and hub in gear unit or assembly interrupted	Return the gear unit to SEW-EURODRIVE for repair

7.4 Malfunction on adapter with a torque limiting coupling AR

Problem	Possible causes	Solution
Unusual, regular running noise	Meshing/grinding noise: Bearing damage	Consult with SEW-EURODRIVE customer service
Oil leaking	Seal defective	Consult with SEW-EURODRIVE customer service
No display on evaluation unit	Encoder on adapter is defective Friction ring pad worn	Measure input pulses, if necessary: • Change encoder of the adapter, see Sec. Inspection/maintenance "Changing the pulse encoder of the adapter"
Slip torque is not reached	• Friction ring pad worn • Cup springs burned out or installed incorrectly after maintenance	Inspect friction ring pads / cup springs, see Sec. Inspection/maintenance "Inspecting/replacing friction ring pads, adjusting the slip torque"

7.5 Repair

Repairs on SEW drives are only allowed to be carried out by trained personnel. Please contact SEW-EURODRIVE customer service.

Only trained personnel are to separate the drive from the motor.

8 Mounting Positions

8.1 General information on mounting positions

Mounting position designation

SEW differentiates between six mounting positions M1 – M6 for gear units. The following figure shows the spatial orientation of the gearmotor in mounting positions M1 – M6.

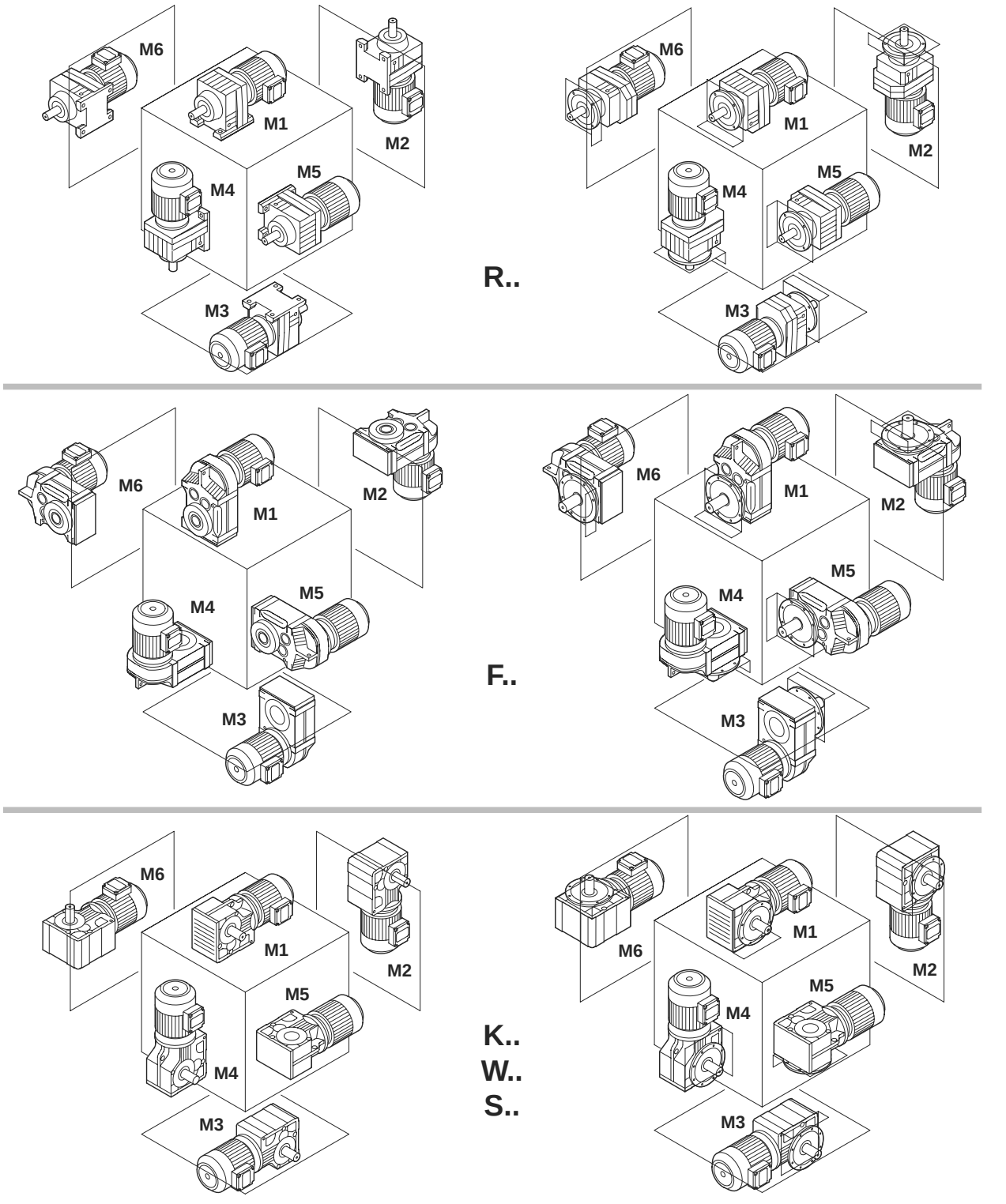


Figure 22: Depiction of mounting positions M1 – M6

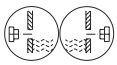
8.2 Key to the mounting position sheets

SPIROPLAN® gearmotors do not depend on any particular mounting position. However, mounting positions M1 to M6 are also shown for SPIROPLAN® gearmotors to assist you in working with this documentation.

Important: No breather valves or oil level checking and drain plugs can be installed on SPIROPLAN® gearmotors.

Symbols used

The following table shows which symbols are used in the mounting position sheets and what they mean:

Symbol	Meaning
	Breather valve
	Oil level check plug
	Oil drain plug

Churning losses

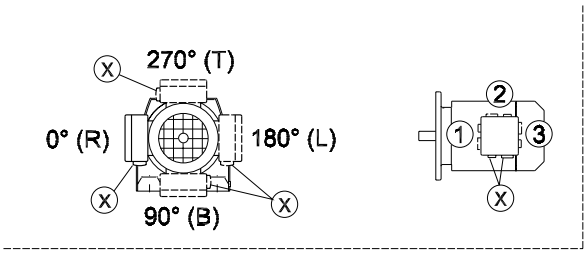
Increased churning losses may arise in some mounting positions. Contact SEW-EURODRIVE in case of the following combinations:

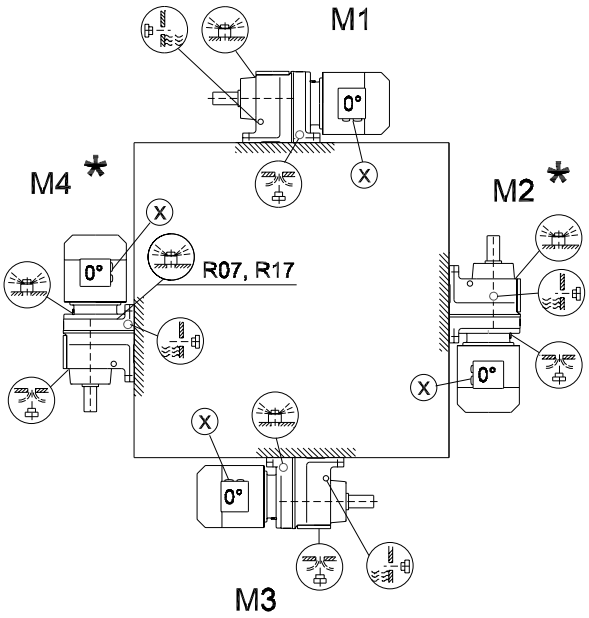
Mounting position	Gear unit type	Gear unit size	Input speed [rpm]
M2, M4	R	97 – 107	> 2500
		> 107	>1500
M2, M3, M4, M5, M6	F	97 – 107	> 2500
		> 107	> 1500
	K	77 – 107	> 2500
		> 107	> 1500
	S	77 – 97	> 2500

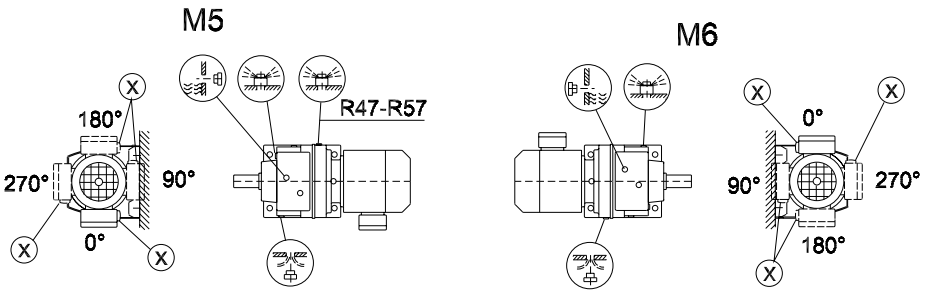
8.3 Mounting positions of R helical gearmotors

R07-R167

04 040 200





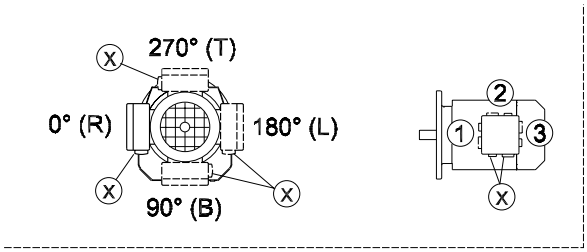


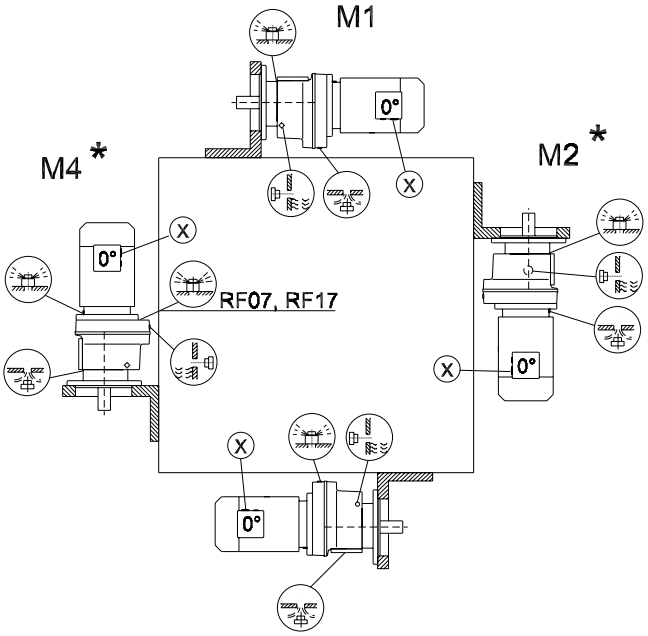
R07		M1, M2 , M3 , M5 , M6
R17, R27		M1, M3 , M5 , M6
R07, R17, R27		
R47, R57		M5

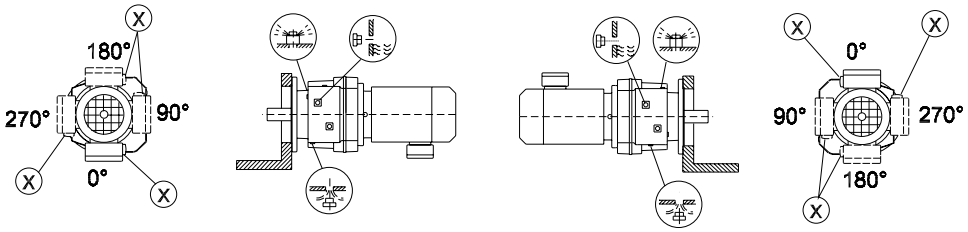
* → page 76

RF07-RF167

04 041 200



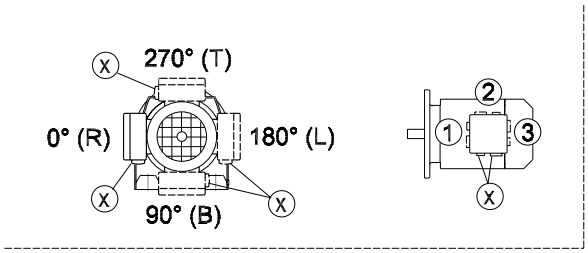


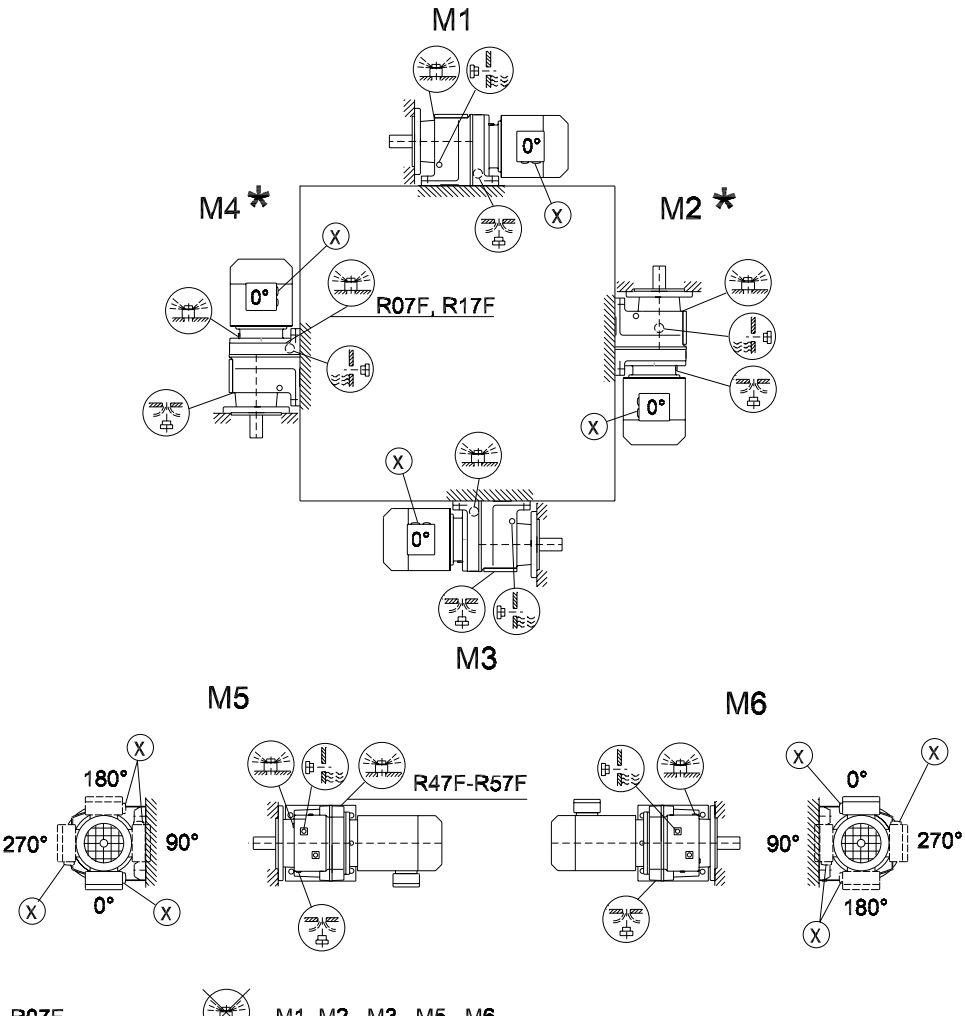


RF07		M1, M2 , M3 , M5 , M6
RF17, RF27		M1, M3 , M5 , M6
RF07, RF17, RF27		
RF47, RF57		M5

* → page 76

R07F-R87F





R07F		M1, M2 , M3 , M5 , M6
R17F, R27F		M1, M3 , M5 , M6
R07F, R17F, R27F		
R47F, R57F		M5

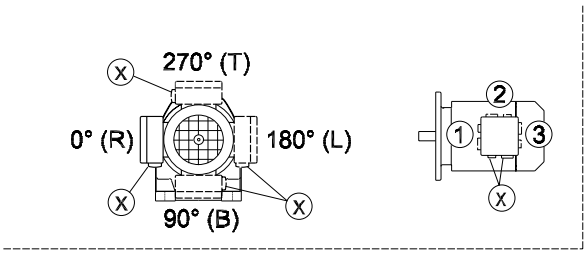
* → page 76

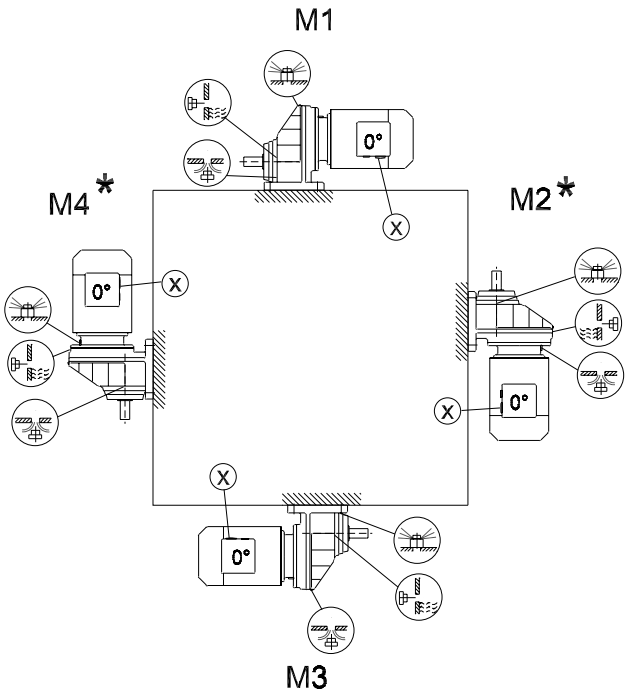
Important: See the (i) information in the "Gearmotors" catalog, Sec. "Project planning for gear units/overhung and axial loads".

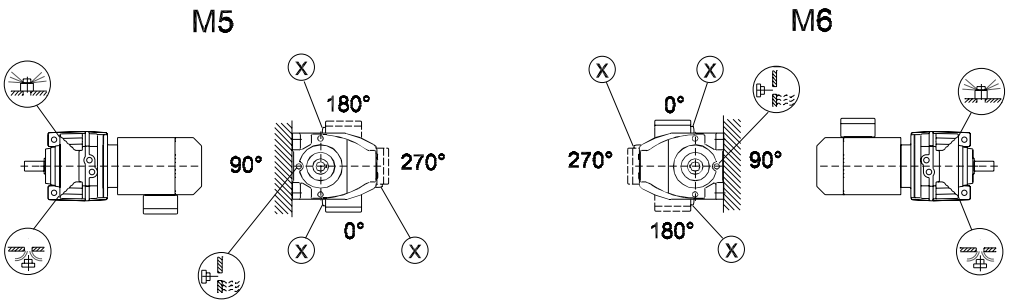
8.4 Mounting positions of RX helical gearmotors

RX57-RX107

04 043 200

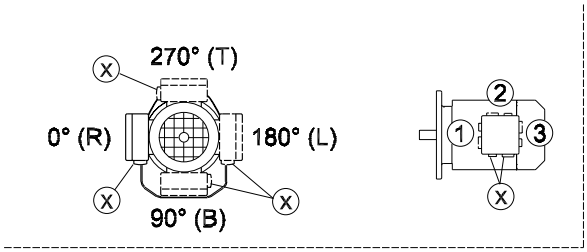


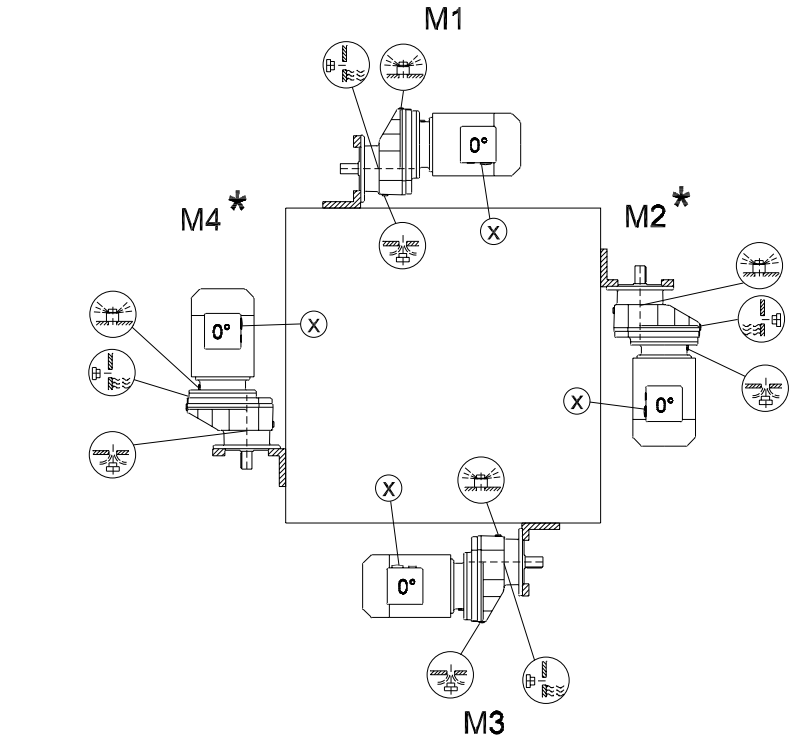


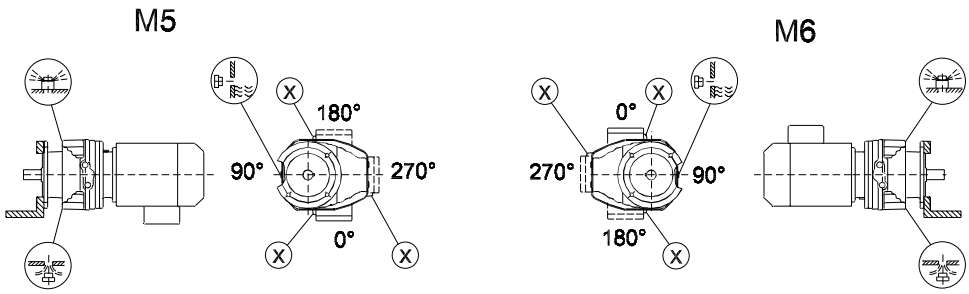


* → page 76

RXF57-RXF107



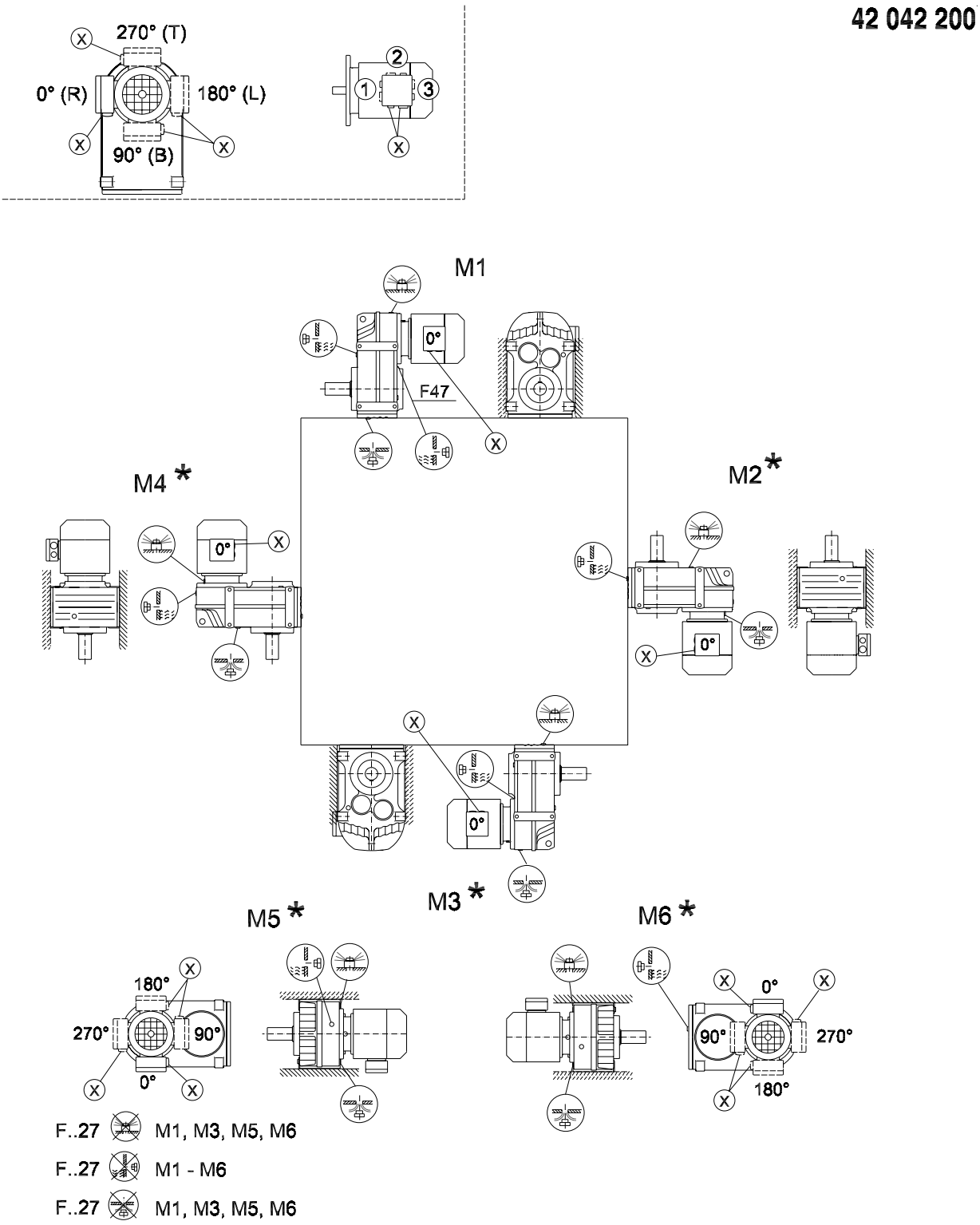




* → page 76

8.5 Mounting positions of parallel shaft helical gearmotors

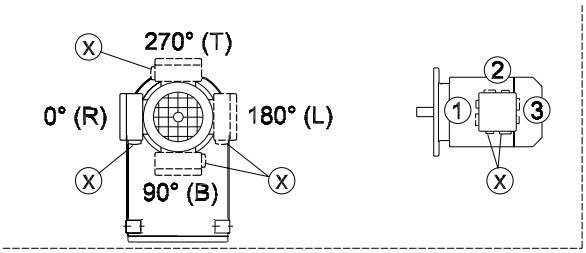
F/FA..B/FH27B-157B, FV27B-107B

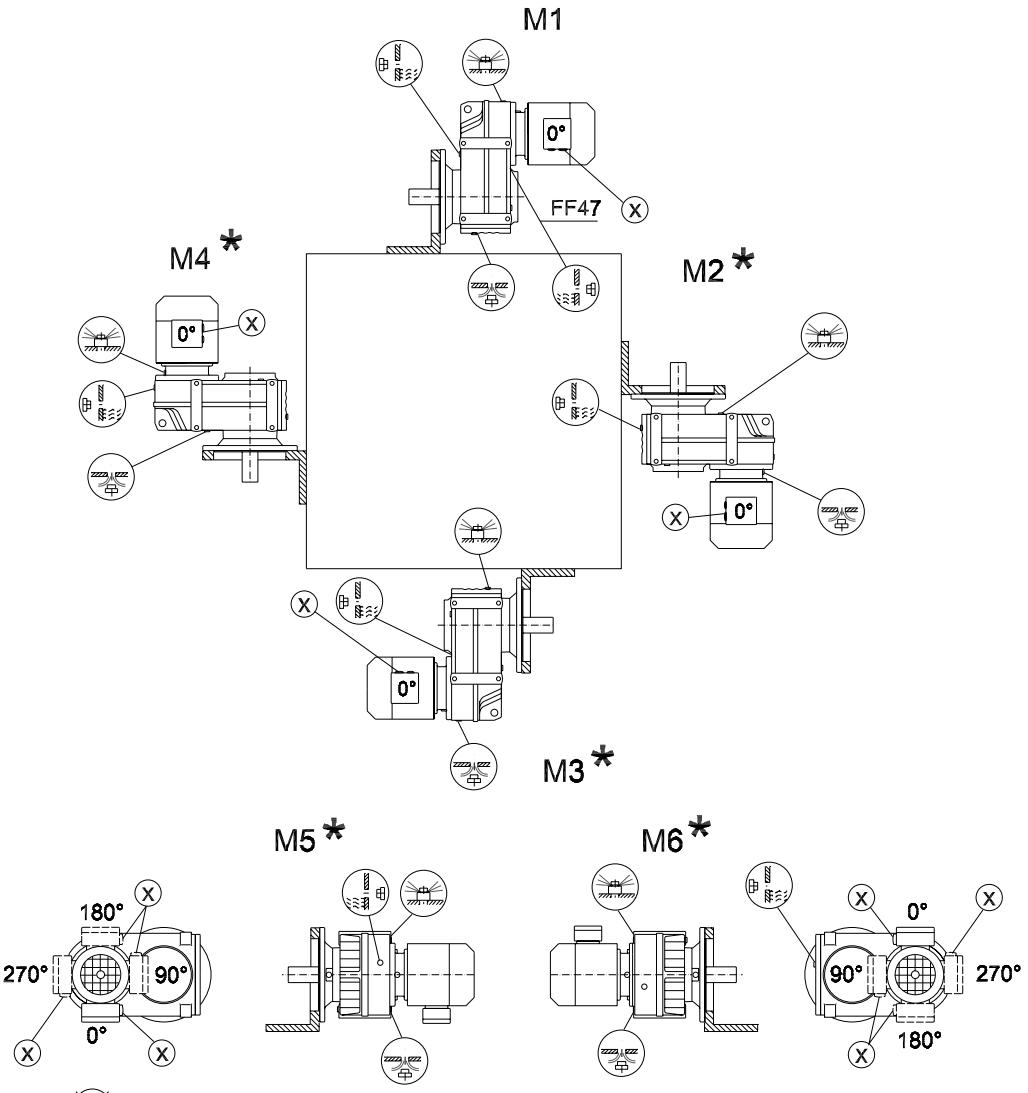


* → page 76

FF/FAF/FHF/FAZ/FHZ27-157, FVF/FVZ27-107

42 043 200





F..27 M1, M3, M5, M6

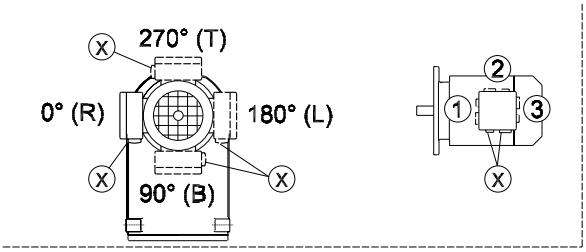
F..27 M1 - M6

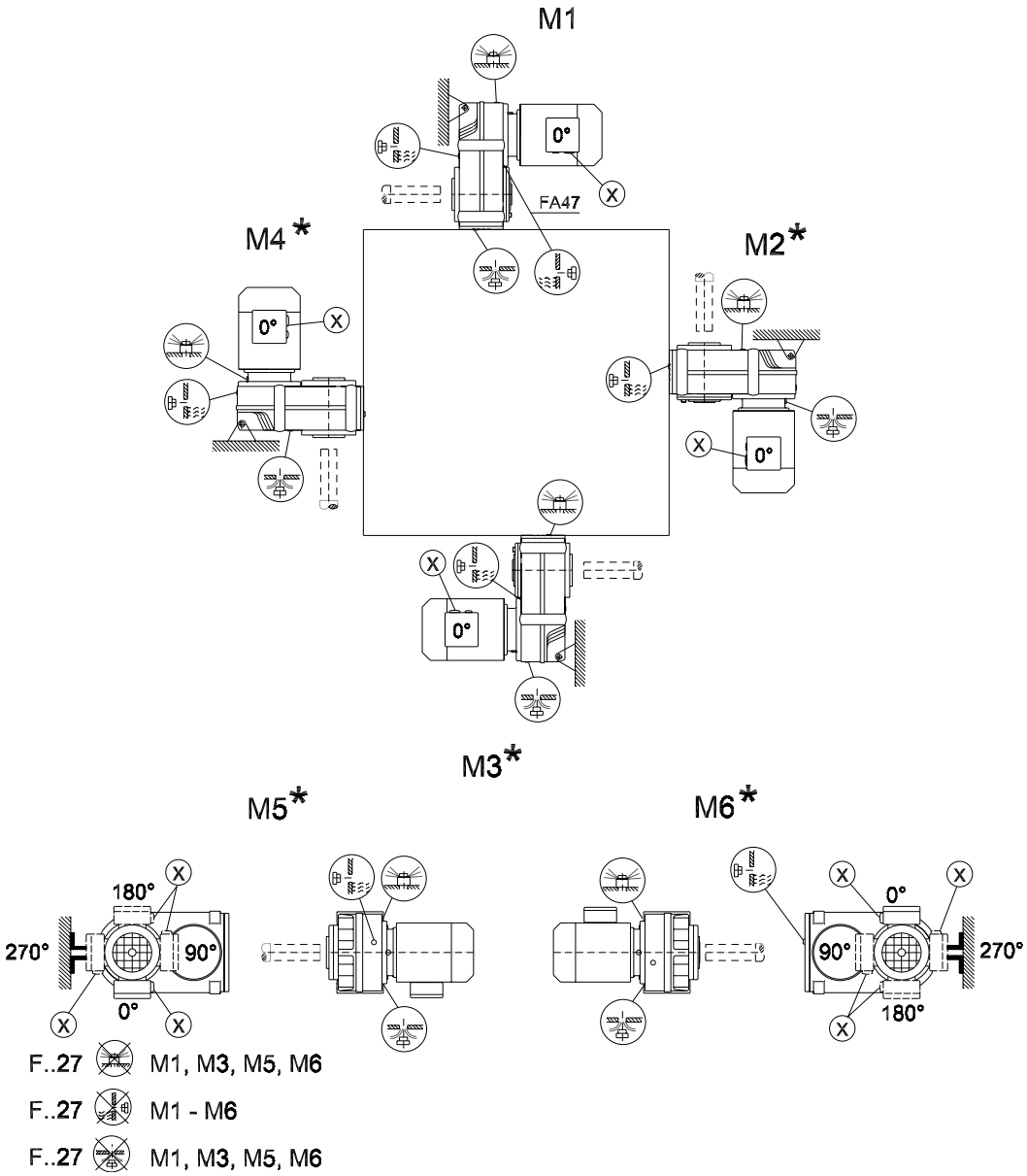
F..27 M1, M3, M5, M6

* → page 76

FA/FH27-157, FV27-107, FT37-97

42 044 200





F..27 M1, M3, M5, M6

F..27 M1 - M6

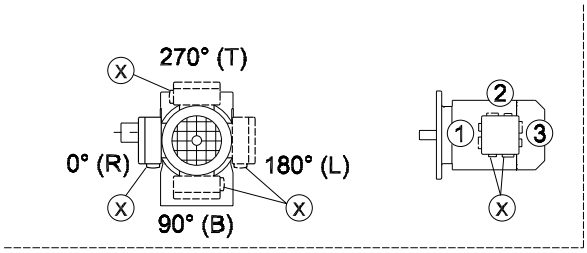
F..27 M1, M3, M5, M6

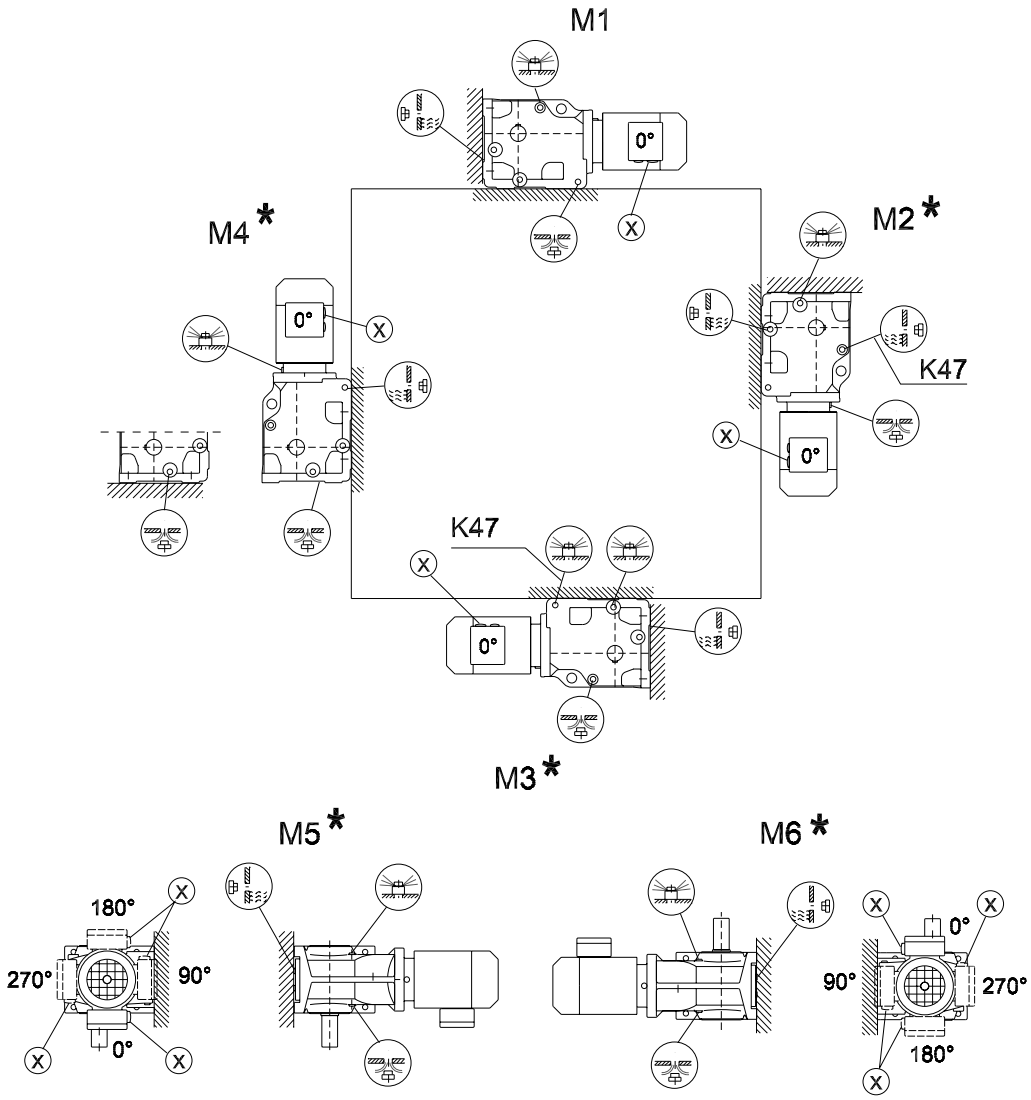
* → page 76

8.6 Mounting positions of helical-bevel gearmotors

K/KA..B/KH37B-157B, KV37B-107B

34 025 200



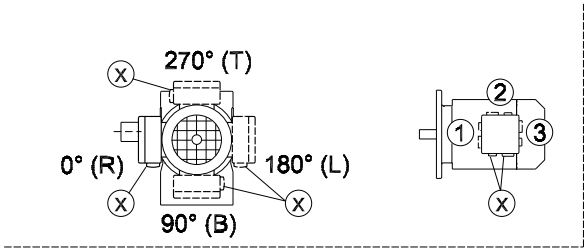


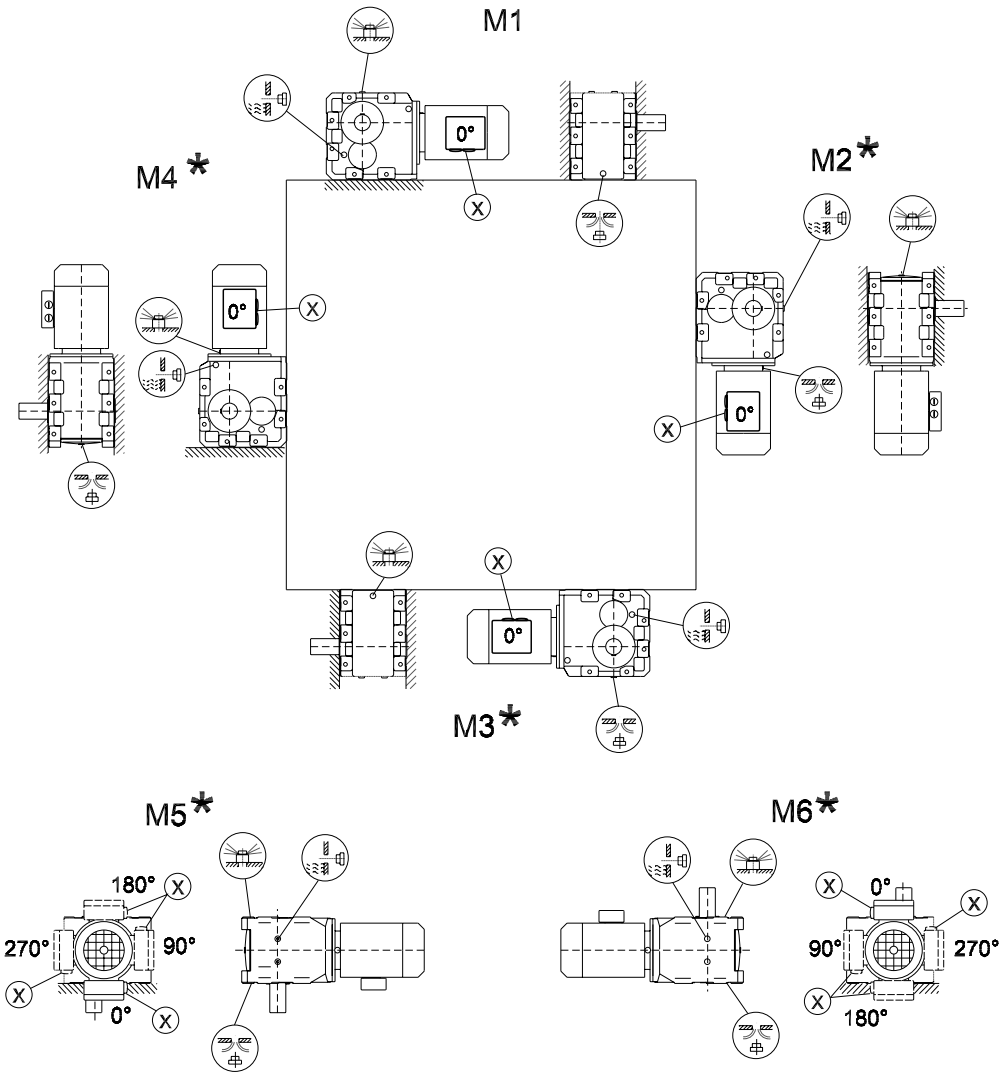
* → page 76

Important: See the (i) information in the "Gearmotors" catalog, Sec. "Project planning for gear units/overhung and axial loads".

K167-187, KH167B-187B

34 026 200



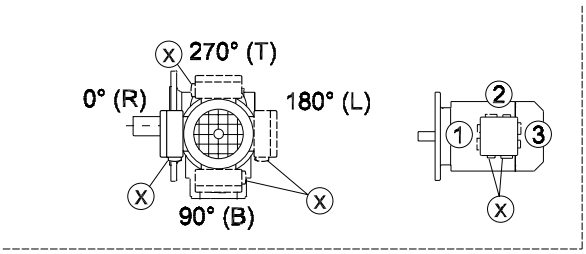


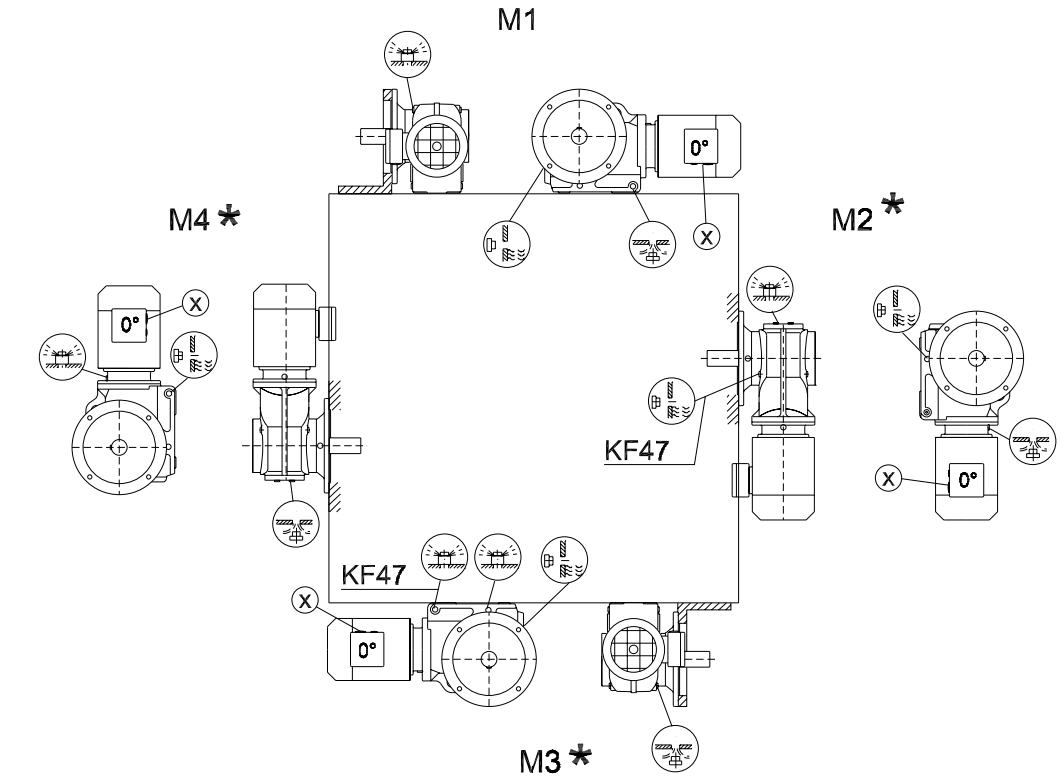
* → page 76

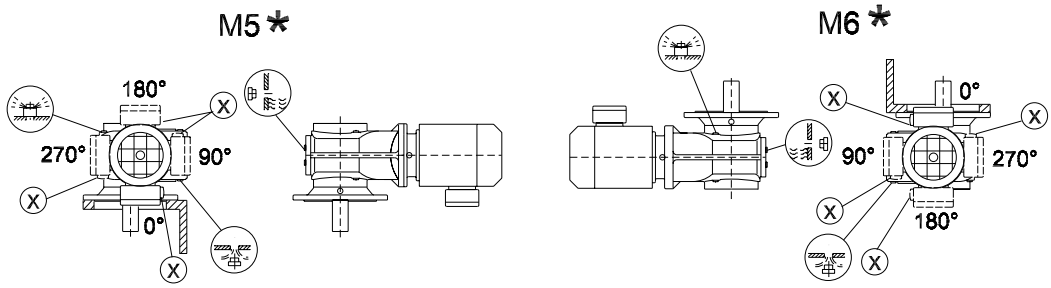
Important: See the (i) information in the "Gearmotors" catalog, Sec. "Project planning for gear units/overhung and axial loads".

KF/KAF/KHF/KAZ/KHZ37-157, KVF/KVZ37-107

34 027 200



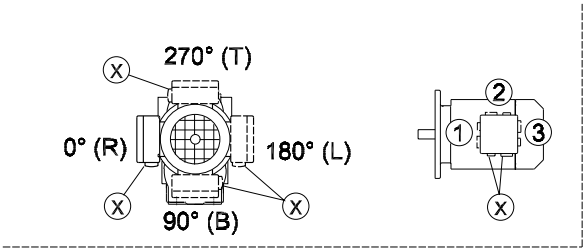


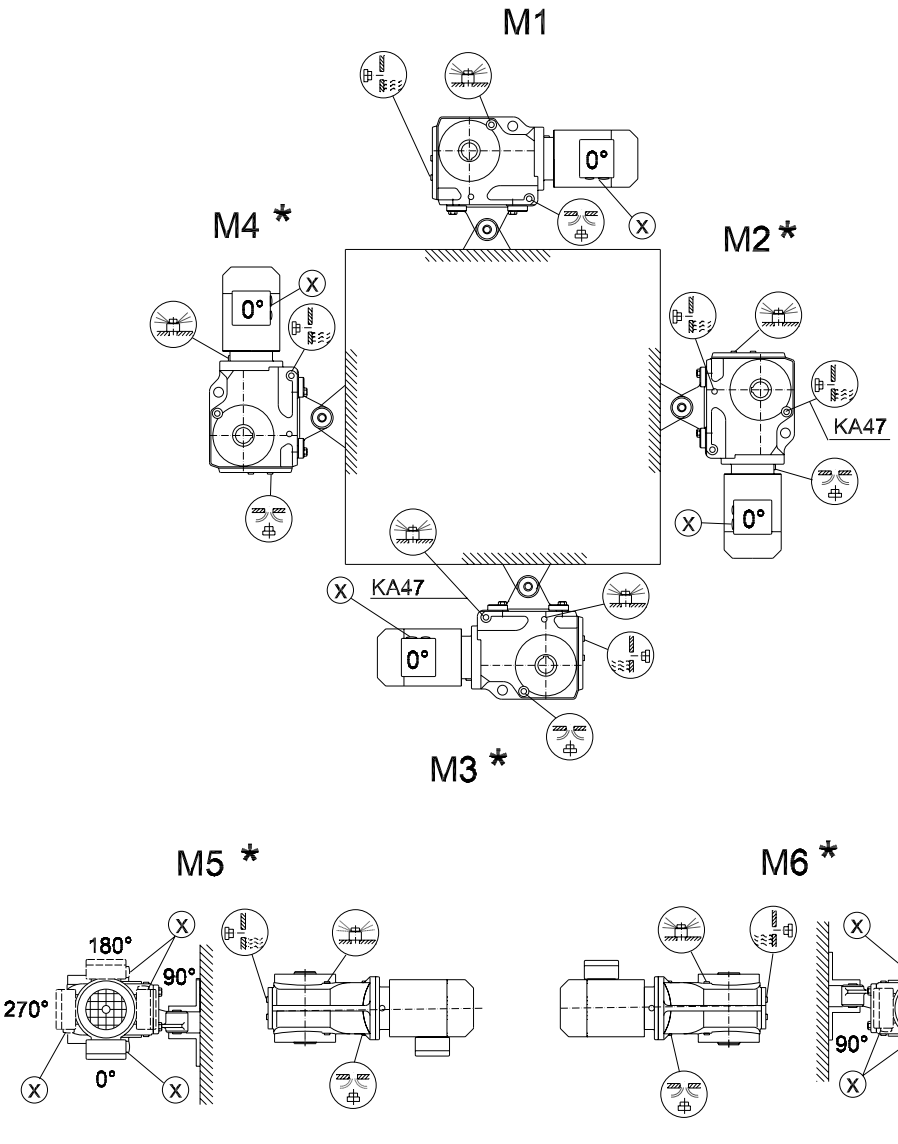


* → page 76

KA/KH37-157, KV37-107, KT37-97

39 025 200

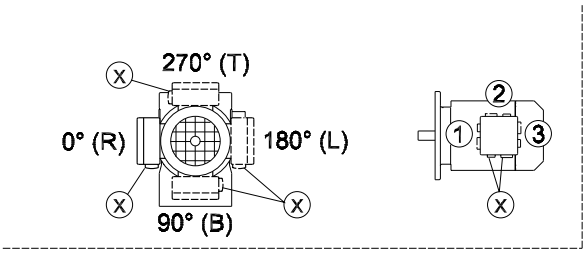


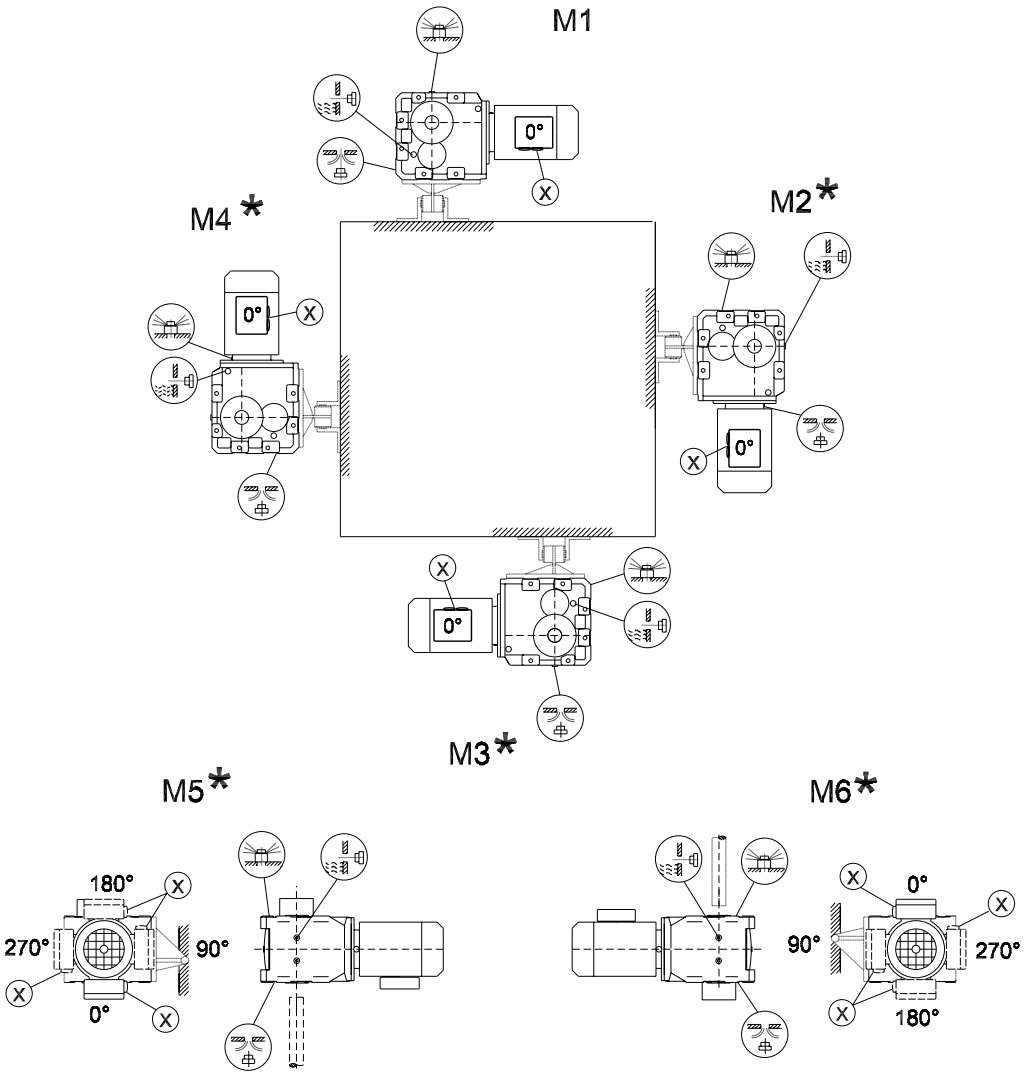


* → page 76

KH167-187

39 026 200

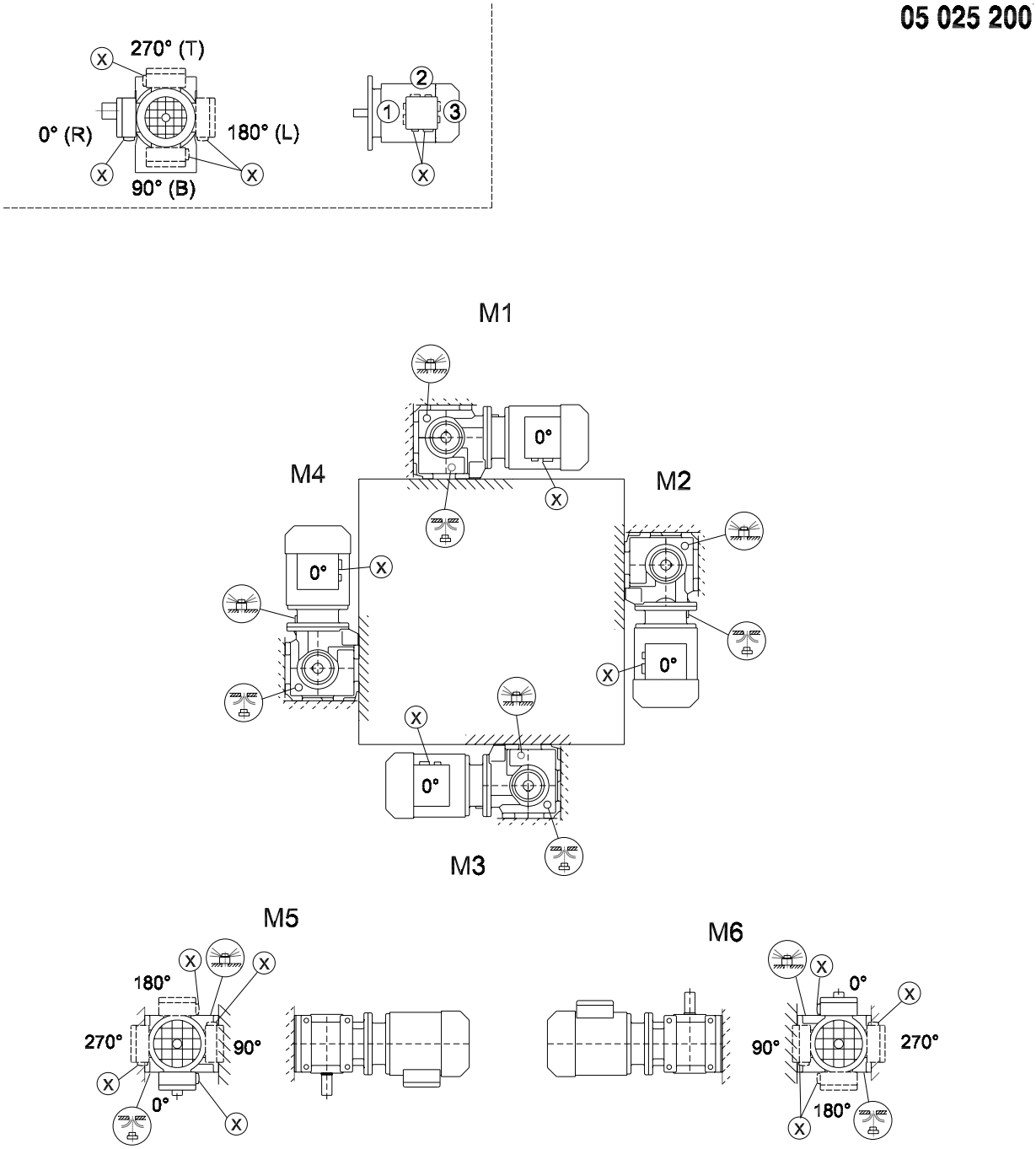




* → page 76

8.7 Mounting positions of helical-worm gearmotors

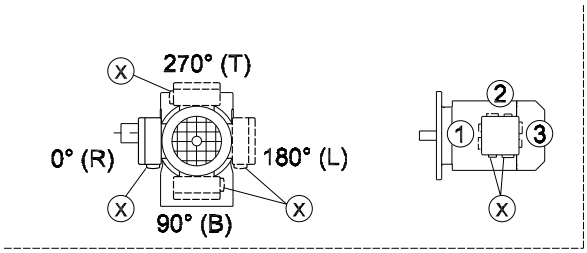
S37

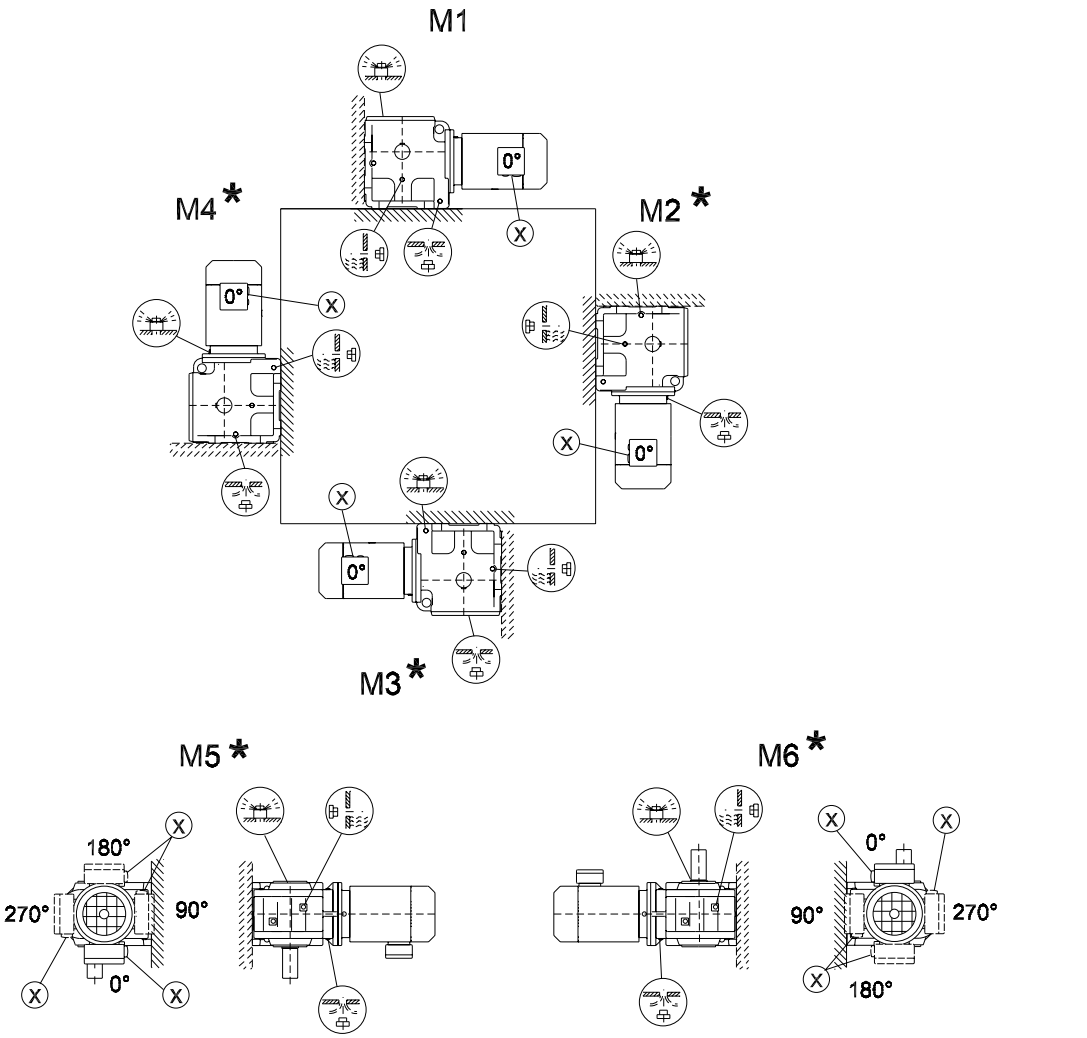


Important: See the (i) information in the "Gearmotors" catalog, Sec. "Project planning for gear units/overhung and axial loads".

S47-S97

05 026 200





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Important: See the information in the "Gearmotors" catalog, Sec. "Project planning for gear units/overhung and axial loads".

SF/SAF/SHF37

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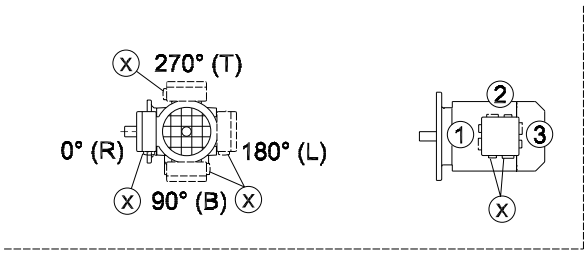

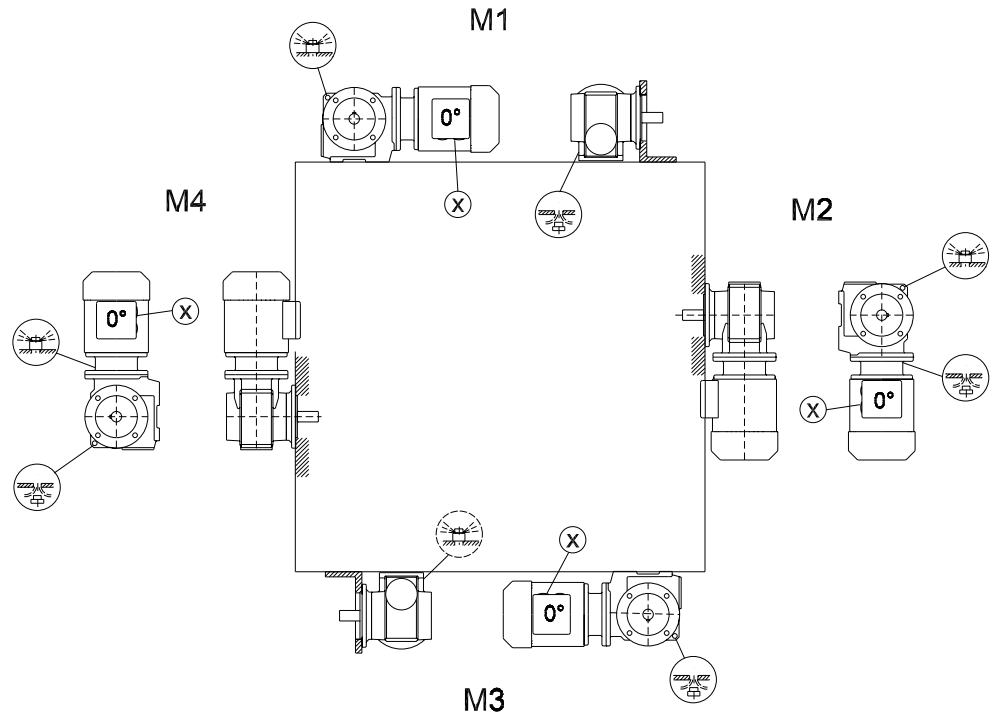

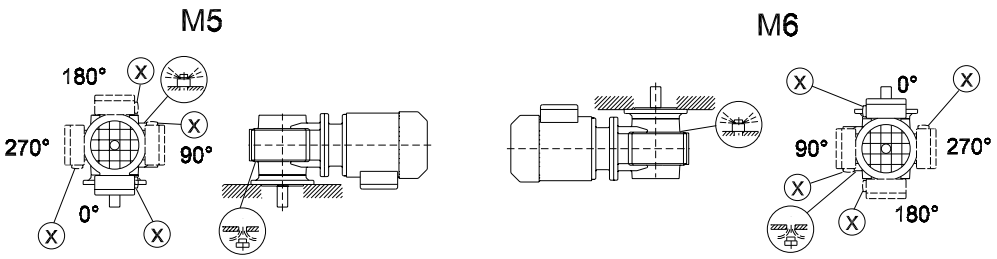

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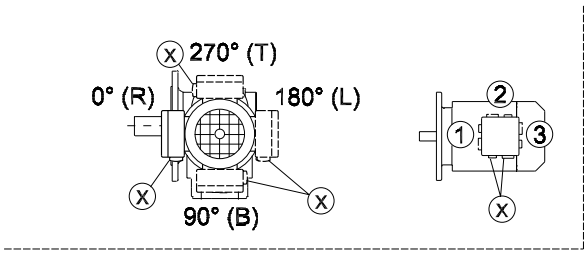

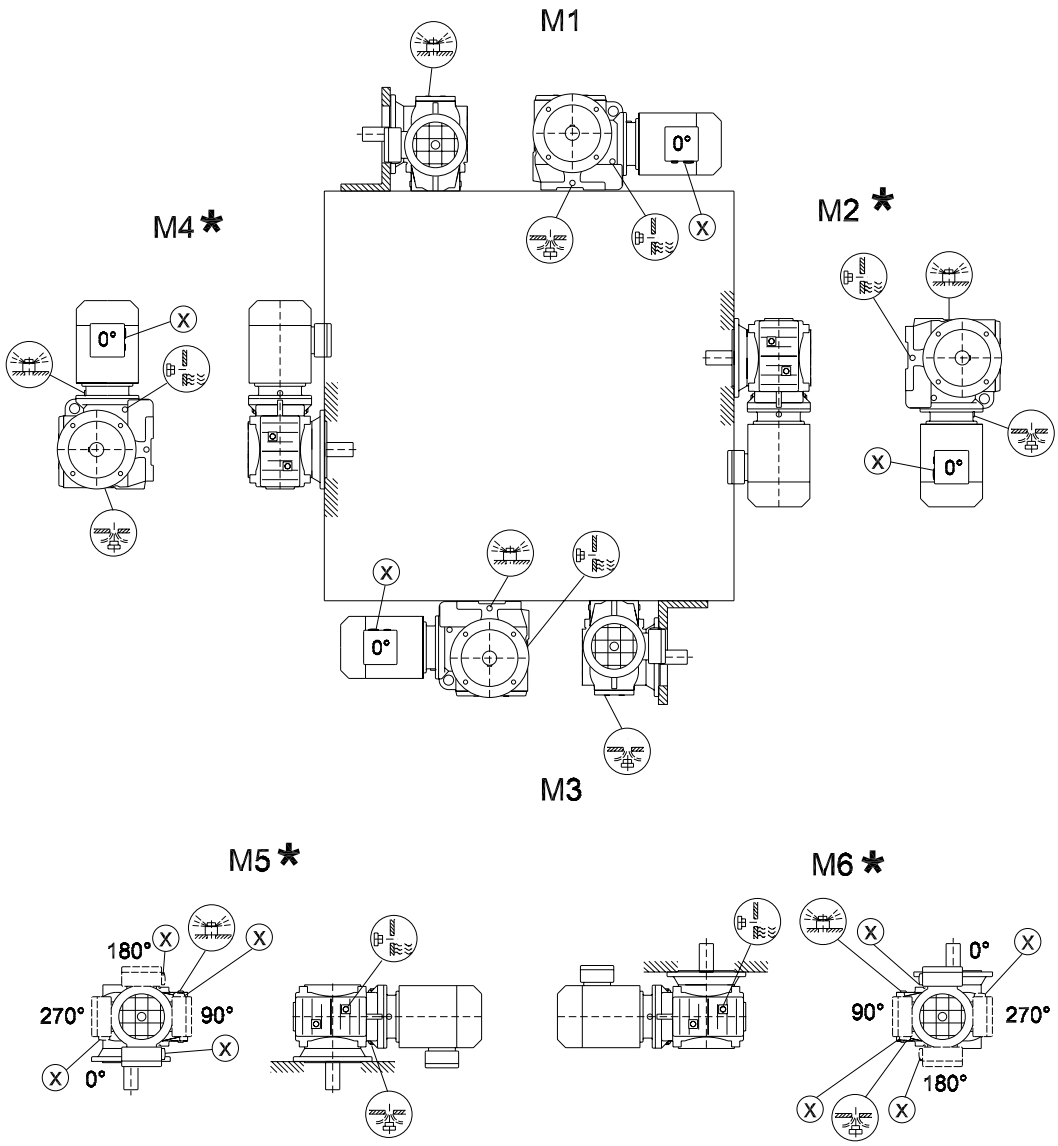

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SA/SH/ST37

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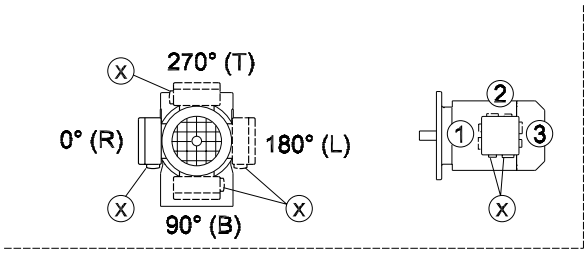

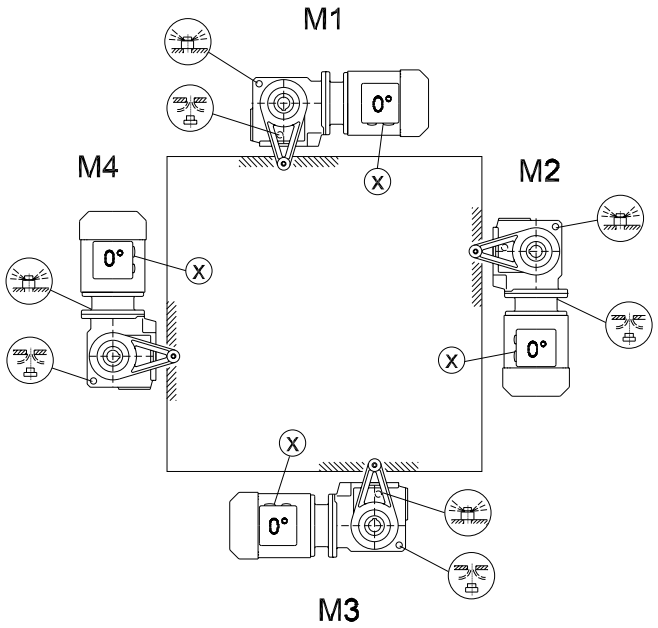

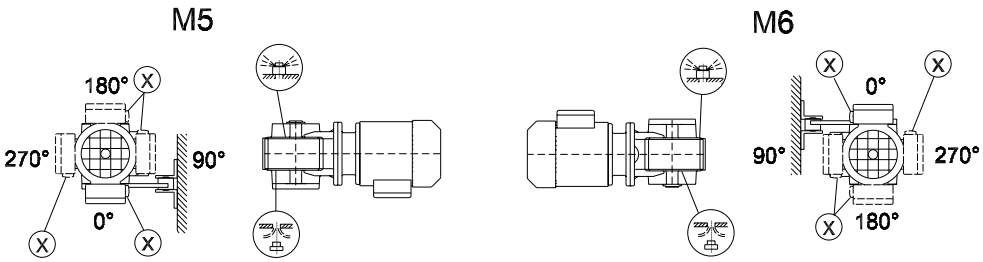

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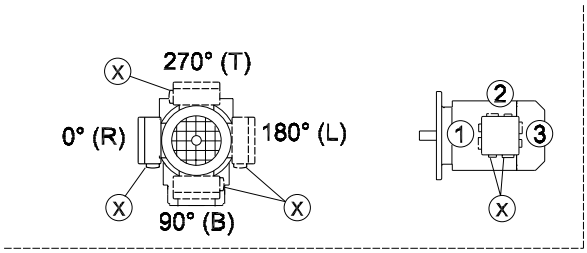

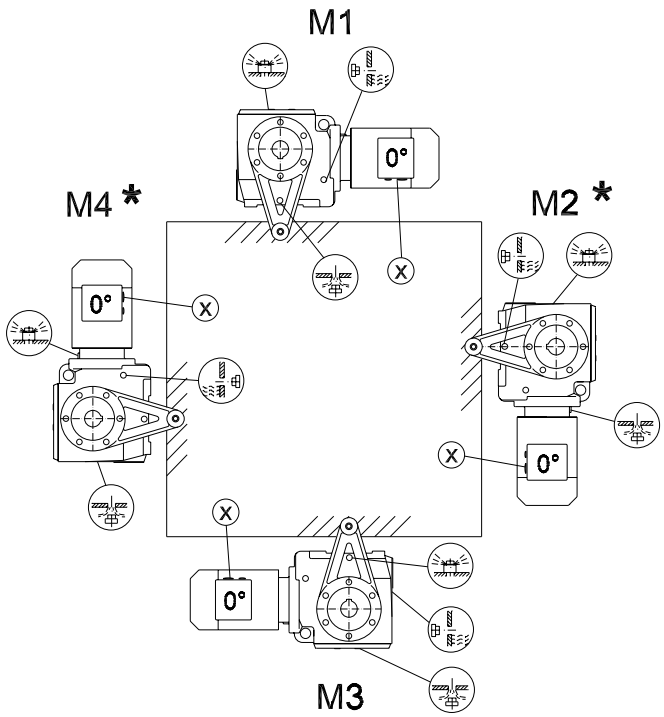

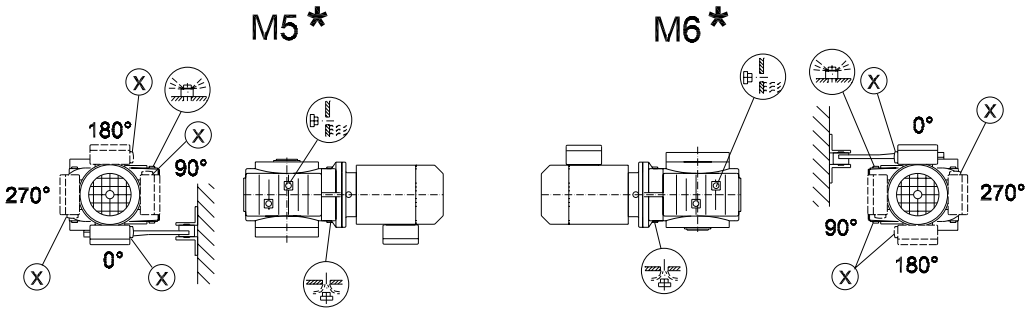

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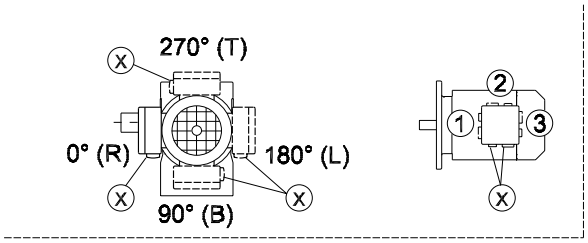
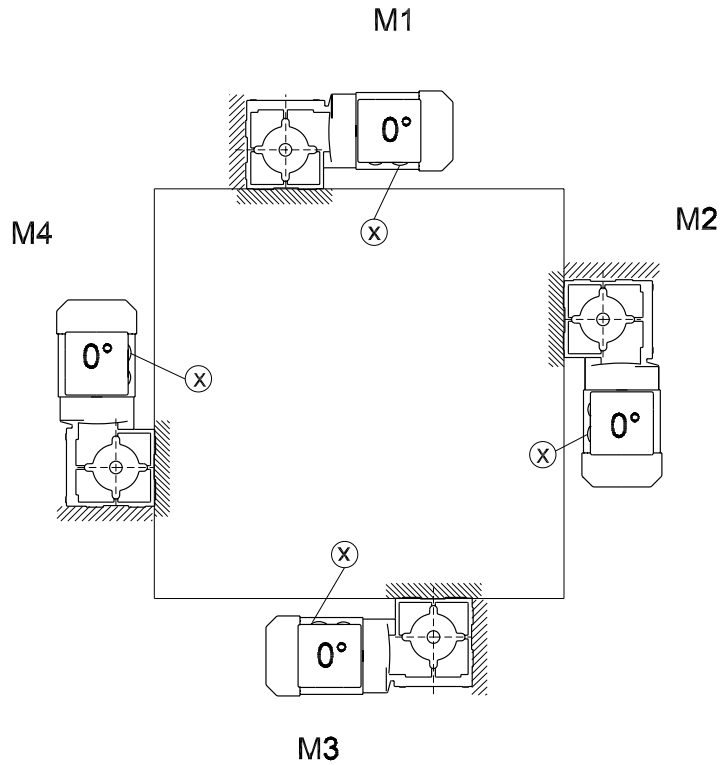
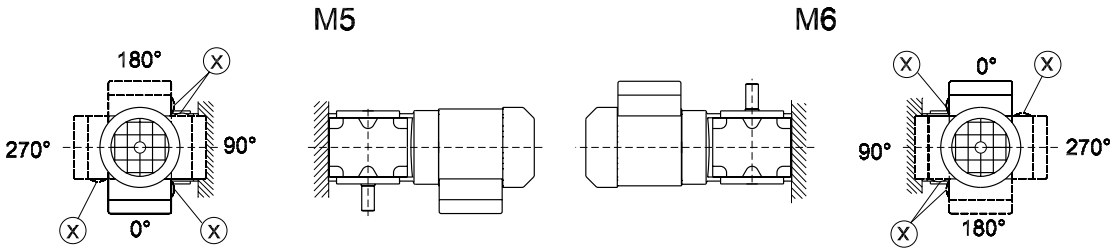
8.8 Mounting positions of SPIROPLAN® W gearmotors

W10-30

20 001 002







WF/WAF10-30

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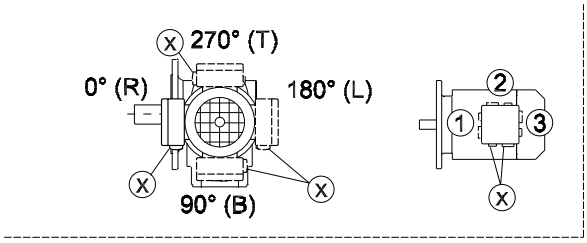

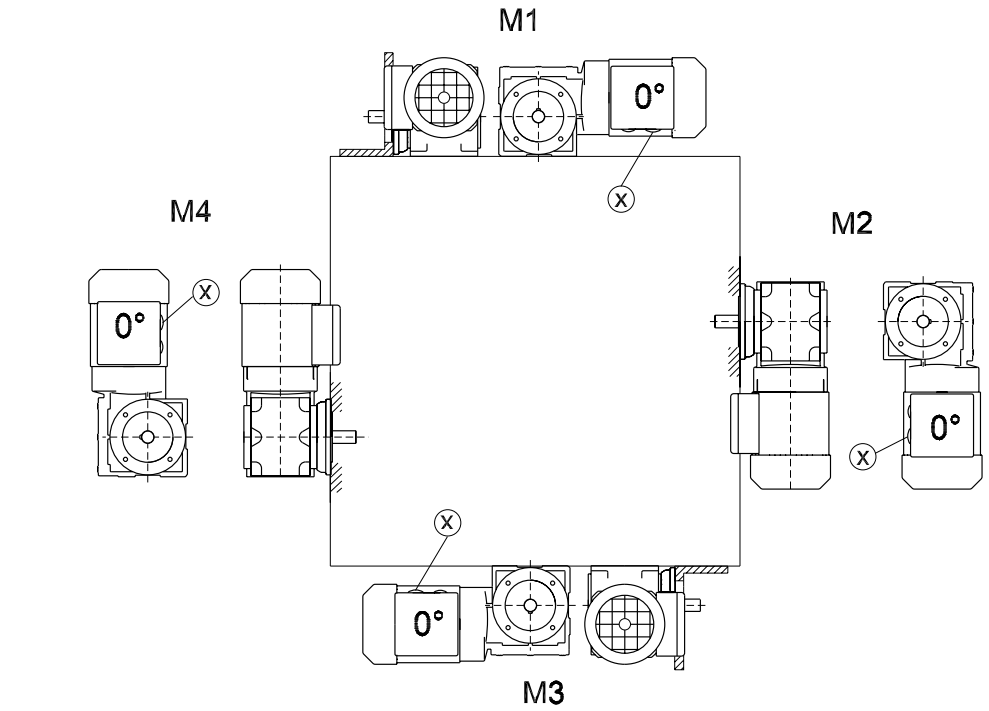

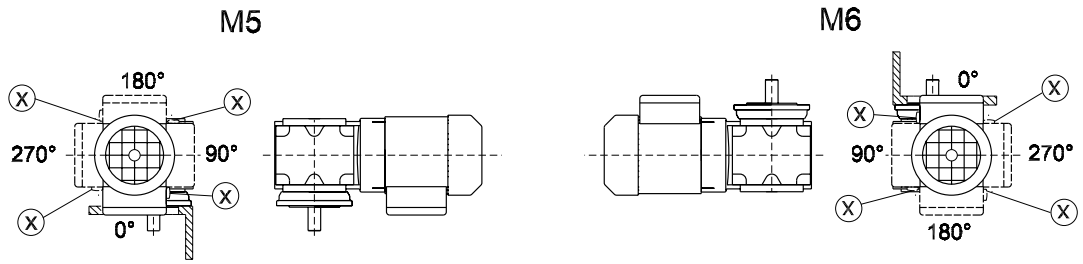

WA10-30

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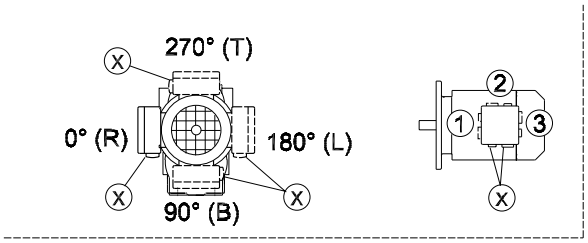
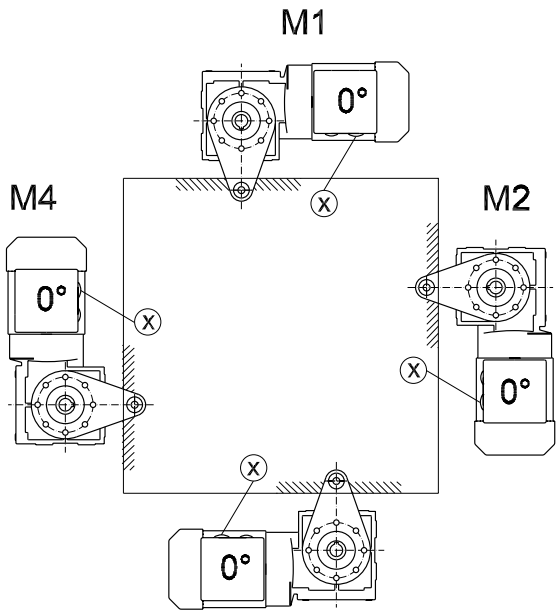
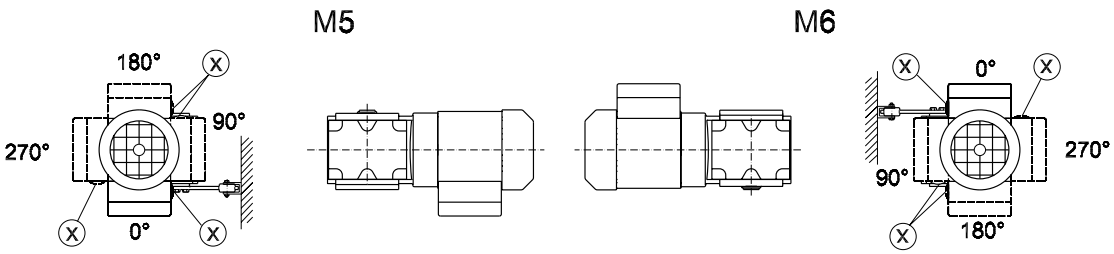




M3



9 Lubricants

General information

Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific gear unit and mounting position. The decisive factor is the mounting position (M1 – M6, → Sec. "Mounting positions and important order information") specified when ordering the drive. You must adapt the lubricant fill to any subsequent changes made to the mounting position (→ Lubricant fill quantities).

It is essential to contact SEW-EURODRIVE regarding a subsequent change of mounting position. Failure to contact us will invalidate the ATEX certification!

Lubricant fill quantities

Refer to the gear unit nameplate for the prescribed lubricant fill quantities of the explosion-proof gear units. When filling, it is essential to check the **oil level plug since it indicates the precise oil capacity**. See Sec. "Startup".

9.1 Lubricant table

The lubricant table on the following page shows the permitted lubricants for SEW-EURODRIVE explosion-proof gear units. Please note the following key to the lubricant table.

Key to the lubricant table

Abbreviations used, meaning of shading and notes:

CLP HC	= Synthetic hydrocarbons
CLP PG	= Polyglycol (W gear units, conforms to USDA-H1)
E	= Ester oil (water pollution danger category WGK 1)
HCE	= Synthetic hydrocarbons + ester oil (USDA-H1 certification)
	= Synthetic lubricant (= synthetic anti-friction bearing grease)
1)	Special lubricant for Spiroplan® gear units only
2)	SEW-$f_B \geq 1.2$
3)	Pay attention to critical starting behavior at low temperatures!
4)	Silicone-free lubricant (food industry grade)
5)	Ambient temperature
	Lubricant for the food industry (food grade oil)
	Biodegradable oil (lubricant for use in agriculture, forestry and water resources)

Anti-friction bearing greases

The anti-friction bearings in explosion-proof gear units and motors are given a factory-fill with the greases listed below. SEW-EURODRIVE recommends regreasing anti-friction bearings with a grease fill at the same time as changing the oil.

	Ambient temperature	Manufacturer	Type
Anti-friction bearing in gear unit	-40 °C – +80 °C	Mobil	Mobiltemp SHC 100
Anti-friction bearing in motor	-40 °C – +60 °C	Klüber	ASONIC GHY72
Special greases for anti-friction bearings in gear units:			
	-30 °C – +40 °C	Aral	Aral Eural Grease EP 2
	-20 °C – +40 °C	Aral	Aral Aralub BAB EP 2

The following grease quantities are required:

- For fast-running bearings (motor and gear unit input end): Fill the cavities between the rolling elements one third full with grease.
- For slow-running bearings (in gear units and at gear unit output end): Fill the cavities between the rolling elements two thirds full with grease.

Lubricant table

01768 200

	5) °C -50 0 +50 +100	DIN (ISO)	ISO,NLGI	Mobil®	Shell	KLÜBER LUBRICATION	ARAL	Tribol	TEXACO	Optimol	FUCHS
R...	3) -40 Standard +80	CLP HC	VG 220	Mobil SHC630	Shell Omala 220 HD	Klübersynth EG 4-220	Aral Degol PAS 220	Tribol 1510/220	Pinnacle EP 220	Optigear Synthetic A 220	Renolin Unisyn CLP 220
K...	3) -40 +40	CLP HC	VG 150	Mobil SHC629		Klübersynth EG 4-150			Pinnacle EP 150		
F...	3) -40 +10	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32			Cetus PAO 46		
S..	3) -30 Standard +80	CLP HC	VG 460	Mobil SHC 634	Shell Omala 460 HD	Klübersynth EG 4-460			Pinnacle EP 460		
	3) -40 +10	CLP HC	VG 150	Mobil SHC 629		Klübersynth EG 4-150			Pinnacle EP 150		
	3) -40 0	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32			Cetus PAO 46		
R...,K... F...,S...	3) -30 +40	HCE	VG 460		Shell Cassida Fluid GL 460	Klüberoil 4UH1-460	4) Aral Eural Gear 460			Optileb GT 460	
	-20 +40	E	VG 460			Klüberbio CA2-460	Aral Degol BAB 460			Optisynt BS 460	
W...	Standard -20 +40	SEW PG	1) VG 460			Klüber SEW HT-460-5					
	-20 +40	CLP PG	2) VG 460			Klübersynth UH1 6-460					

10 Declaration of Conformity

10.1 Gearmotors in categories II2G and II2D

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Str. 42
D-76646 Bruchsal

Konformitätserklärung

Declaration of Conformity

(im Sinne der Richtlinie 94/9/EG, Anhang VIII)
(according to EC Directive 94/9/EC, Appendix VIII)

SEW-EURODRIVE erklärt in alleiniger Verantwortung, dass die R-, K-, F-, S- und W- Getriebemotoren der Kategorie 2G und 2D, auf die sich diese Erklärung bezieht, mit der

declares in sole responsibility that the R-, K-, F-, S- and W-gear motors in categorie 2G and 2D that are subject to this declaration are meeting the requirements set forth in

Richtlinie 94/9/EG
Directive 94/9/EC

übereinstimmen.

Angewandte Norm:	**EN 1127-1, prEN 13463-1, prEN 13463-5, prEN 13463-8, EN 60529**
Applicable standard:	***EN 1127-1, prEN 13463-1, prEN 13463-5, prEN 13463-8, EN 60529***

SEW-EURODRIVE hinterlegt die gemäß 94/9/EG, Anhang VIII geforderten Unterlagen bei benannter Stelle:
FSA GmbH, EU-Kennnummer 0588.

SEW-EURODRIVE *will archive the documents required according to 94/9/EC, Appendix VIII at the following location:*
FSA GmbH, EU-Code 0588.

SEW-EURODRIVE GmbH & Co KG

Bruchsal, den 04.11.2003
Ort und Datum der Ausstellung
Place and date of issue

ppa
Funktion: Vertriebsleitung / Deutschland
Function: Head of Sales / Germany

10.2 Gear units in categories II2G and II2D with adapter AM, AQA, AL, AD

SEW-EURODRIVE GmbH & Co KG
Ernst Blickle Str. 42
D-76646 Bruchsal

Konformitätserklärung

Declaration of Conformity

(im Sinne der Richtlinie 94/9/EG, Anhang VIII)

(according to EC Directive 94/9/EC, Appendix VIII)

SEW-EURODRIVE erklärt in alleiniger Verantwortung, dass die R-, K-, F- und S-Getriebe mit den Anbaukomponenten AM, AQA, AL und AD der Kategorie 2G und 2D, auf die sich diese Erklärung bezieht, mit der

Declares in sole responsibility that the R-, K-, F-, S-gear with the input components AM, AQA, AL and AD in category 2G and 2D that are subject to this declaration are meeting the requirements set forth in

Richtlinie 94/9/EG

Directive 94/9/EC

übereinstimmen.

Angewandte Norm:	**EN1127-1, prEN 13463-1, prEN 13463-5, prEN 13463-8, EN 60529**
Applicable standard:	**EN1127-1, prEN 13463-1, prEN 13463-5, prEN 13463-8, EN 60529**

SEW-EURODRIVE hinterlegt die gemäß 94/9/EG Anhang VIII geforderten Unterlagen bei benannter Stelle:

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SEW-EURODRIVE will archive the documents required according to 94/9/EG at the following location:

FSA GmbH, EU Code 0588

SEW-EURODRIVE GmbH & Co KG

Bruchsal, den 04.11.2003

Ort und Datum der Ausstellung
Place and date of issue

ppa

Funktion: Vertriebsleitung / Deutschland
Function: Head of Sales / Germany

10.3 Gear units in categories II3G and II3D with adapter AR

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Str. 42
D-76646 Bruchsal

Konformitätserklärung

Declaration of Conformity

(im Sinne der Richtlinie 94/9/EG, Anhang VIII)
(according to EC Directive 94/9/EC, Appendix VIII)

SEW-EURODRIVE erklärt in alleiniger Verantwortung, dass die Stirnradgetriebe R/RF32 der Kategorie 3G und 3D, auf die sich diese Erklärung bezieht, mit der

declares in sole responsibility that the helical gear units R/RF32 in categories 3G and 3D that are subject to this declaration are meeting the requirements set forth in

Richtlinie 94/9/EG
Directive 94/9/EC.

übereinstimmen.

Angewandte Norm: **EN 1127-1**
Applicable standard: ***EN 1127-1***

SEW-EURODRIVE hält die gemäß 94/9/EG geforderten Unterlagen zur Einsicht bereit.

SEW-EURODRIVE *will make available the documents required according to 94/9/EC for reference purposes.*

SEW-EURODRIVE GmbH & Co KG

Bruchsal, den 04.11.2003

ppa

Ort und Datum der Ausstellung
Place and date of issue

Funktion: Vertriebsleitung / Deutschland
Function: Head of Sales / Germany

11 Appendix

11.1 Index of changes

In comparision to the previous edition of these "Explosion-Proof Gear Units R..7, F..7, K..7, S..7, SPIROPLAN® W Series" operating instructions (publication number: 1055520x, edition 11/2002), this edition includes the following amendments and changes:

General amendments and corrections.

Safety Notes	• Additional safety notes.
Mechanical Installation	• Setting up the gear unit: Information on problems with uneven surfaces. • Installation of torque arms for shaft-mounted gear units: Information on retaining screws. • Shaft-mounted gear units with shrink disc: Additional information on installation / removal. • Shaft-mounted gear units with TorqLOC®. • Coupling of AM adapter: Dimension A. • Adapter with torque limiting coupling AR.
Startup	• Speed monitoring. • Installation and setting of WEX speed monitor. • Installation of voltage encoder.
Inspection and Maintenance	• Lubricant replacement intervals. • Inspection/maintenance work adapter AR.
Malfunctions	• Malfunction adapter with torque limiting coupling AR.

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Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54, route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at

Belgium			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos/SP - Cep.: 07251-250	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GMBH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9532565 Fax +359 2 9549345 bever@mbox.infotel.bg

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 4322-99 Fax +237 4277-03

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.reynolds@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Street LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 sewsales@entelchile.net

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 victor.zhang@sew-eurodrive.cn http://www.sew.com.cn

China			
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021 P. R. China	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew.com.cn

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 sewcol@andinet.com

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@net.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Luná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 220121234 + 220121236 Fax +420 220121237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30, P.O. Box 100 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Paldiski mnt.125 EE 0006 Tallin	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 3 589-300 Fax +358 3 7806-211 http://www.sew-eurodrive.fi sew@sew-eurodrive.fi

Gabon			
Sales	**Libreville**	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 2 7960477 + 79604654 Fax +852 2 7959129 sew@sewhk.com

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

India			
Assembly **Sales** **Service**	**Baroda**	SEW-EURODRIVE India Pvt. Ltd. Plot No. 4, Gidc Por Ramangamdi · Baroda - 391 243 Gujarat	Tel. +91 265 2831021 Fax +91 265 2831087 mdoffice@seweurodriveindia.com
Technical Offices	**Bangalore**	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bangalore	Tel. +91 80 22266565 Fax +91 80 22266569 sewbangalore@sify.com
	Mumbai	SEW-EURODRIVE India Private Limited 312 A, 3rd Floor, Acme Plaza Andheri Kurla Road, Andheri (E) Mumbai	Tel. +91 22 28348440 Fax +91 22 28217858 sewmumbai@vsnl.net

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 lirazhandasa@barak-online.net

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 2 96 9801 Fax +39 2 96 799781 sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Toyoda-cho**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Toyoda-cho, Iwata gun Shizuoka prefecture, 438-0818	Tel. +81 538 373811 Fax +81 538 373814 sewjapan@sew-eurodrive.co.jp

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate Unit 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 master@sew-korea.co.kr

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139386 Fax +371 7139386 info@alas-kuul.ee

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com

Lithuania			
Sales	**Alytus**	UAB Irseva Merkines g. 2A LT-4580 Alytus	Tel. +370 315 79204 Fax +370 315 79688 irmantas.irseva@one.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 kchtan@pd.jaring.my

Morocco			
Sales	**Casablanca**	S. R. M. Société de Réalisations Mécaniques 5, rue Emir Abdelkader 05 Casablanca	Tel. +212 2 6186-69 + 6186-70 + 6186-71 Fax +212 2 6215-88 srm@marocnet.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 241-020 Fax +47 69 241-040 sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Lodz	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucuresti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Sales	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 263 RUS-195220 St. Petersburg	Tel. +7 812 5357142 +812 5350430 Fax +7 812 5352287 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 849 47-70 Fax +221 849 47-71 senemeca@sentoo.sn

Serbia and Montenegro			
Sales	**Beograd**	DIPAR d.o.o. Kajmakcalanska 54 SCG-11000 Beograd	Tel. +381 11 3046677 Fax +381 11 3809380 dipar@yubc.net

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 ... 1705 Fax +65 68612827 sales@sew-eurodrive.com.sg

Slovakia			
Sales	**Sered**	SEW-Eurodrive SK s.r.o. Trnavska 920 SK-926 01 Sered	Tel. +421 31 7891311 Fax +421 31 7891312 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO – 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 dross@sew.co.za
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 9 4431 84-70 Fax +34 9 4431 84-71 sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442-00 Fax +46 36 3442-80 http://www.sew-eurodrive.se info@sew-eurodrive.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 41717-17 Fax +41 61 41717-00 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chon Buri**	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.co.th

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 7, rue Ibn El Heithem Z.I. SMMT 2014 Mégrine Erriadh	Tel. +216 1 4340-64 + 1 4320-29 Fax +216 1 4329-76

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri Sirketi Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 + 216 4419164 + 216 3838014 Fax +90 216 3055867 sew@sew-eurodrive.com.tr

USA			
Production **Assembly** **Sales** **Service**	**Greenville**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6381 cshayward@seweurodrive.com
	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 sewventas@cantv.net sewfinanzas@cantv.net

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